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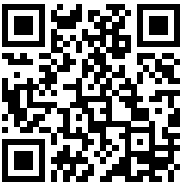

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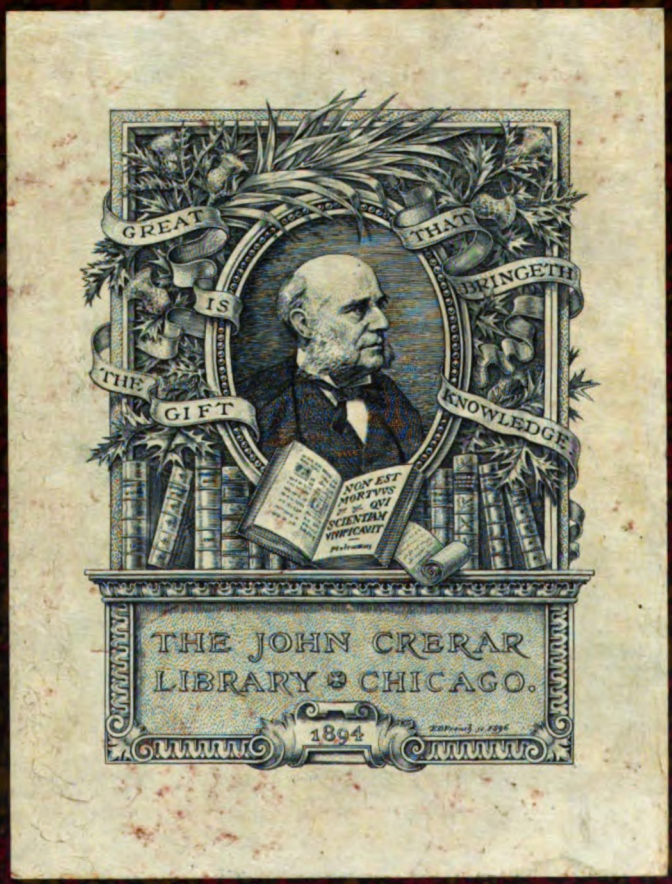

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Artillery in Co-operation with Infantry.

By MAJOR C. E. D BUDWORTH, M.V.O., R.H.A.

THIS lecture, addressed principally to infantry officers, is published by request.

It was delivered:—

At Dublin.—The General Officer Commander-in-Chief, General the Right Hon. Sir N. G. Lyttleton, G.C.B., in the chair.

At the Curragh.—General Waldron. C.B., in the chair.

At Belfast.—General Wilson, C.B., in the chair.

I. General Remarks on Co-operation.

All questions of field artillery material, organisation and procedure, have ultimately to be tested by whether they lend themselves or not to successful co-operation with the other arms on the field of battle.

The reputation of the artilleryman does, or should, rest upon his ability to render those arms effective assistance.

However small may be the losses due to artillery fire in battle, it has been repeatedly demonstrated that the extent of your losses, and indeed your success or failure, are largely dependent on the co-operation of an artillery superior to that of the enemy.

Artillery is not only a death dealer, it is a life saver.

We all know how vital this question of co-operation is. Unfortunately it is far easier to talk about its necessity than it is to ensure its execution, owing largely to insuperable difficulties in practising it in peace time under conditions approximating to those of war.

Co-operaton is of itself no more important to-day than it used to be, but it is rendered far more difficult by the conditions under which modern battles are waged.

I have chosen this subject in the hope of placing before you some of the difficulties under which we artillerymen suffer in trying to co-operate effectively with you, and also incidentally to tell you what little I can about artillery action and fire effect.

II. The right spirit.

First of all I will presume that before ever we go to war we artillerymen are imbued with the right spirit. That is to say, that

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we realise that we are not merely in the position of seconding you, but must enter the "ring" ourselves, and that success or failure, whether in attack or defence, is as much our affair as it is yours.

III. KNOWLEDGE OF INFANTRY.

Before we go to war, we require a working knowledge of infantry in general and of the infantry with whom we are likely to be called upon to co-operate in particular.

IV. KNOWLEDGE OF PLAN OF ACTION.

To co-operate effectively with you in the field, we must know what your aim and object is and your rough plan of action.

We realise that any such plan is liable to undergo considerable modification and we do not require it in detail, but if you trust entirely to our ability to pick up what you are doing and where you are going by aid of telescope or field glass, you are not giving us a fair chance of intelligently combining our action with yours.

You will say, "But this is always ensured, at any rate in the Vth and VIth Divisions."

Yes, and I am sure in the other Divisions also. But it has been known to happen otherwise in war.

Help the artilleryman as much as you can in this respect, you will not find it time thrown away.

V. INFLUENCE OF HOSTILE ARTILLERY ACTION.

(a). Gun shields and frontal time shrapnel fire:—

As long as they remain under cover of them, gun shields afford the detachments efficient protection against the frontal time shrapnel fire of guns at all ranges.

(b). Direct hits on shielded guns and wagons:—

Up to about 3000 yards on the practice ground it is comparatively easy to obtain direct hits on them, either with percussion shrapnel or high explosive shells. (Our field guns, as you know, do not fire H.E. shells).

Either of these kinds of shell, if a direct hit is obtained, would probably put the detachment out of action, and the high explosive shell would in all probability effectively damage the equipment.

The attempt to obtain direct hits at a distance of over 3000 yards does not justify the expenditure of ammunition incurred.

In war, to obtain direct hits below 3000 yards would be a matter of much greater difficulty than on the practice ground, so that, pending the possible introduction of guns of very high velocity and flat trajectory, we have under ordinary circumstances little to fear from direct hits.

(c). Gun shields and howitzer fire:—

The frontal time shrapnel fire of such howitzers, as those with which we hope soon to be re-armed, may prove more deadly, but to produce effect with all plunging fire, great accuracy is necessary.

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(d). Gun shields and rifle fire:—

I may add that our shields are rifle bullet proof against the more modern sharp-nosed bullets at about 600 yards and against our own at about 400 yards.

At these ranges guns could be worked under frontal rifle fire for some time with comparatively little loss, although casualties would gradually be caused by ricochet bullets, especially by those striking the wheels.

(e). Artillery procedure simplified in the open:—

The artilleryman finds it far easier to work in the open than behind cover, because in the open all procedure is simplified, particularly the selection of the observing station, command and communication.

(f). The importance of concealment:—

What then have we to fear from the enemy's artillery fire, and why all this fuss about concealed positions and cover? In spite of what has already been said, if our guns are put in exposed positions, we have still to ensure their being able to carry out their tasks.

(g). Oblique fire:—

Firstly because shields are no protection against oblique fire. If we try to move in to effective ranges, before obtaining some superiority of fire, the long range of modern field guns will allow the enemy to manœuvre so as to bring oblique fire to bear on us.

The great value of the heavy gun is in this respect self evident.

(h). Can shielded guns be expected to perform their task under heavy shrapnel fire:—

Secondly, the exposure of guns permits the enemy to range accurately on them. Shielded guns with their wagons along side make a very conspicuous target.

Even a shielded battery cannot carry on its fire without some exposure of officers and men.

Russian-Japanese experience shows us that unshielded batteries cannot be trusted to carry out their task under heavy time shrapnel fire. But the same experience demonstrates more than this, namely, that entrenched batteries, whose position can be located, are not likely to meet with success.

Shields are of enormous value to guns, they minimise losses, enable guns to prolong an unequal contest, and render it very difficult, if not impossible, permanently to silence their fire, but I do not think that shielded batteries, any more than entrenched batteries whose position can be located, will be able for long to pursue their task, under heavy and accurate time shrapnel fire.

(i). The loss of mobility and the difficulty of replenishing ammunition:—

Thirdly, we have to beware of loss of mobility. We may succeed in bringing our guns safely into action in an exposed position.

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Possibly we may succeed in maintaining our fire, but can we again move or replenish ammunition?

For artillery, the loss of mobility is the crossing of the Rubicon, it ceases to be available for general purposes. Its wings are clipped. Twelve Q.F. guns may be incapable of permanently silencing the fire of six in an exposed position, but two Q.F. guns, once range and fuze are found, may well be capable of tying them to their ground until nightfall.

To replenish ammunition under heavy fire by driving up fresh wagons would seldom be feasible, and replenishment by hand presents considerable difficulties.

Exposed guns sacrifice the element of surprise in their fire and are unable to break off an unequal contest and recommence it under more favourable circumstances.

(j). Caution necessary in selecting initial artillery positions:—

Are we to conclude, therefore, that guns are not to be placed in the open? I do not think so for one moment, but I do assume that a commander will be cautious in exposing his guns. especially when with advanced troops, in the early stages of an action, because he may thus be exposing them to an unequal contest, and may find them unable to carry out their task; because he may thus commit them to a position from which they can neither advance, nor be extricated in case of necessity, and in which they may be unable to replenish ammunition, and finally because he may not desire to advertise his intentions.

(k). The value of long range guns:—

I will here add a few words on the subject of long range in guns. The time shrapnel of our field gun is effective up to rather more than 6000 yards, and a longer burning fuze would still further extend its radius of effect.

It is noticeable that on the conclusion of every war, artillery long range firing is shown to have had little destructive effect. It is equally noticeable that steps are promptly taken to increase the range of guns.

I believe that most regulations recommend that artillery fire should be withheld as long as possible, yet the next war invariably results in artillery firing at increased ranges.

Look back at one war after another, and you will see that the initial positions occupied by artillery have a tendency to become more and more distant.

Theory or no theory, from compulsion or choice, artillery firing is bound to take place at very distant ranges.

It is unnecessary to dwell on the advantages accruing to the side possessing long range guns. Oblique fire and the selection of artillery positions are facilitated.

The enemy is hampered in his choice of positions, forced to early deployment, and a feeling of insecurity is created.

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VI. LOCATING AND SHELLING THE ENEMY'S POSITION.

The artilleryman's next great difficulty is connected with the enemy's position.

(a). Where and what is it?:—

Reconnaissance by telescope and field glass may fail to disclose it. The real position may be covered by advanced posts, which the mounted troops have been unable to drive in. The enemy may decline in any way to divulge his strength or intentions until you by your action compel him to do so.

(b). The futility of bombardment previous to the infantry advance:—

But, further, whether the position occupied consists of field entrenchments, villages, woods, or anything else, you can expect under ordinary circumstances no real effect from artillery fire until you by your action force the defenders into activity.

It is no doubt a magnificent and an inspiriting sight to see hill sides smothered with shrapnel, and villages and woods wreathed in the smoke of bursting shell, but do not let us deceive ourselves. Until the defenders are forced into activity, the results are likely to be practically nil.

(c). Forcing the enemy into activity:—

It does not matter what the particular form of cover is, if oblique fire can be brought to bear—good, but if not, field guns cannot destroy it, and the defenders may lie quite secure until such time as you force them to expose themselves. Once they are exposed your field guns can hit, and hit hard.

(d). Howitzer fire:—

But what about howitzers? Yes, howitzers may prove very effective, if you can accurately locate the target. The value of howitzer fire lies, as you know, in its steep angle of descent and its powerful high explosive shell.

Now all plunging fire demands accuracy; and howitzers find it no easier to locate the targets than guns do.

(e). High explosive shell:—

The effect of a high explosive shell, unless in a confined space, or on rocky ground, or unless a direct hit can be obtained, is very small; on soft ground it is almost negligible. This is why small H.E. shells used with field guns have hitherto proved so disappointing.

No amount of head cover, likely to be improvised in the field, is capable of keeping out our howitzer or heavy gun H.E. shells, but to hit you must be able to locate, and here is the difficulty.

H.E. shells are excellent against houses, but can you thus destroy whole villages? Not unless you can set them on fire.

(f). Absence of incendiary effect in shells:—

It is unfortunate that our projectiles have very little incendiary

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effect; otherwise this would constitute our best means of assisting you to drive the defenders from a village. As far as I know, foreign artillery are no better off in this respect than we are.

The total result is that bombardment, previous to the infantry advance, leads to a great expenditure of valuable ammunition and to much disappointment, if to nothing worse. To locate the enemy's position we must be prepared to fight for it.

(g). The smoke curtain:—

Some artillery are enabled to assist their infantry in a way which is only partially possible for us.

Their shells contain a very powerful smoke-producing composition. By firing very rapidly a curtain of smoke is drawn in front of the attacking infantry and under cover of this it pushes forward. I have seen an example at a foreign practice camp, and believe that it would be efficacious under favourable atmospheric conditions.

(h). Obstacles and artillery fire:—

Artillery fire cannot be trusted to destroy obstacles, such as barbed wire entanglements, &c., even if they can be located.

VII. Ammunition supply.

The artilleryman's next difficulty is one of ammunition supply. The power of a Q.F. gun resides principally in its capacity for developing a great volume of fire in a short space of time.

Under experimental conditions our Q.F. field guns are capable of firing some eighteen to twenty rounds a minute. Under service conditions this rate of fire may be halved, since it is then practically dependent on the rapidity of the laying and of the fuze setting, both of which are slower under such conditions. Nine rounds per gun a minute from a six-gun battery may be regarded as very rapid fire.

This would represent over 19,000 bullets per minute.

Firing with this rapidity a battery might expend all the ammunition carried in its wagons and limbers in twenty minutes. This is not likely to occur, but still it shows us that we must, under ordinary circumstances, be miserly in the use of our ammunition, in order to take full advantage when favourable opportunity offers of the quick firing powers of the gun.

(a). Utilisation of artillery bursts of fire:—

We cannot afford to keep up a continuous fire for long, and, therefore, our action must be combined with yours so as to enable you to take full advantage of our bursts of fire.

VIII. Possible dangers incurred by Infantry from the fire of their own Artillery.

With regard to our next difficulty I will quote the words of our "Field Service Regulations."

"In the decisive attack, artillery fire will be continued until it "is impossible for the artillery to distinguish between their own and

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" the enemy's infantry. The danger from shells bursting short is " more than compensated for by the support afforded, if fire is main- " tained to the last moment; but in order to reduce this danger, it " is the duty of the artillery commanders to keep themselves informed " as to the progress of their infantry, and to discontinue fire against " the objective of the assault when the infantry is getting to close " quarters, if such fire cannot be readily observed and controlled."

To obtain our object we may often find ourselves obliged to fire over your heads. The danger to you from our shell. is small provided that:—

(1). We have accurately located our target.

(2). We can distinguish between friend and foe.

(a). Short bursting shells:—

The danger of short bursting shells, assuming the above, is a very small one.

(b). Difficulty in locating the target:—

The difficulty in accurately locating our target is a very great one, especially if it is a matter of locating machine gun fire. Can we hope to do so from the battery position by the aid of telescope and field glass? I doubt it. I think that it is essential to push forward artillery observers to reconnoitre and report on the target.

The matter of whether we are using direct or indirect laying does not affect the question of your safety.

The important point is that the officer directing the fire should be sure of his target and have a good field of view.

(c). Distinguishing between friend and foe:—

The chief danger is, I think, that the artillery may mistake you for the enemy, and deliberately fire on you, or mistake the enemy for you and not fire on them.

(d). Necessary artillery precautions:—

In default of precautions I do not think that this danger begins and ends with the assault. How are we to guard against it? You will notice that in the " Field Service Regulations " the artillery is held responsible for keeping themselves informed of the movements of the infantry.

First of all we must know your plans, &c.; secondly, we must keep constantly in touch with you, and thirdly, we must push guns as much forward as possible.

(e). Inter-communication between artillery and infantry:—

To keep in touch with you, since the responsibility rests with us, we must send forward an artillery representative; he must be an officer, however ill we can spare him. We shall, therefore, have to push forward an officer and N.C.O's and men, to reconnoitre and locate the target, to establish communication with you, and furnish us with the requisite information concerning your movements and those of the enemy, and all other information which may conduce to our assisting you and rendering our fire most effective.

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Although we assist ourselves in this way, we are still dependent on you for a great deal of what we require to know. I presume that such information would naturally either emanate from or pass through the officer directing the attack.

It seems reasonable, therefore, to suppose that he would make use of the above mentioned channel of communication, and that a position in his vicinity would best satisfy the requirements of the officer sent forward by us.

On this subject opinions differ widely. Many officers are in favour of fixing the responsibility for the establishment of communication and the furnishing of information upon the infantry.

In my opinion—we do require you to furnish us with information, and unless you do so, you cannot count upon the most effective artillery support, but I do not think that the responsibility should be thrown on you for the following reasons:—

However glad we may be to receive information from a company commander or even a more junior officer or a N.C.O., information to be of the greatest value to us, should be received from a more authoritative source, *i. e.*, the officer responsible for the direction of the attack. This officer and his limited staff can scarcely be expected to devote all the necessary attention, amidst other distracting considerations, to this one phase of the action. Even if they could do so, the artilleryman still remains the ultimate arbiter of where his shells are placed, and nothing can free him from this responsibility.

Consequently, even if the responsibility in question, became yours, we should still have to send forward artillery representatives.

As to the means at our disposal, for maintaining communication, we have a limited amount of telephone equipment, signalling equipment, in which possibly Dietz Discs might find a place with advantage, and orderlies.

To determine whether these means suffice and how they are best employed requires a more practical demonstration than any which I have hitherto been fortunate enough to see.

IX. Close Support and Movement on the Battlefield.

Our next difficulty is one of movement on the field of battle. Quoting once again from the "Field Service Regulations":—

"A portion of the artillery must be pushed forward to within "close artillery ranges, so as to deal with possible counter-attacks "and to give the infantry immediate assistance, when the fluctuations "of the fight make it necessary."

(a). How is it to be done?:—

How are we to do this? We know how difficult the Japanese found movement on the battlefield by daylight. We may find it equally so.

Are we to push forward by batteries, sections, or single guns? and how close? All such speculations are idle, the answer must

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depend on the special circumstances, tactical and topographical, of the particular case.

(b). The spirit of close support:—

Let it be sufficient that close support is here clearly enunciated. It is well, for were it not so, the risks that attend the pushing forward of guns are so obvious, and the arguments which can be adduced to show it to be unnecessary so plausible, that we might come to lose what I will call our spirit of "close support," which is as necessary to us as your "bayonet spirit" is to you, and may be compared to it in more respects than one. This spirit once lost in time of peace is not likely to be regained in time of war.

(c). Necessity of crowning the position when won:—

Once the position is carried, it is a critical time. You may be exposed to a violent counter-assault, to support which the enemy's guns are likely to be favourably placed, whilst ours, unless hurriedly pushed forward, are not likely to be able effectively to co-operate with you. We must, therefore, rapidly push forward guns to the position when once it is taken.

X. Tte Characteristics of our Available Artillery.

What guns have we to assist you?
Our divisional artillery consists of:—

(a). Field guns:—

Field guns capable of developing a great volume of fire in a short space of time and of rapidly searching or sweeping a considerable extent of ground with their shrapnel bullets.

(b). Field howitzers:—

Field howitzers with their plunging fire and high explosive shells, able to fire from behind steep cover and maintain their fire until the last moment of the assault.

(c). Heavy guns:—

Heavy guns, of limited mobility and unprovided with gun shields, but possessing powerful high explosive shells and able by the aid of their long range, to search with oblique fire ground only exposed to the distant frontal fire of field guns, and to assist effectively in the protection of your flanks.

XI. The necessity for Central Guidance.

The rôles of these three classes of artillery are supplementary and not interchangeable.

(a). Economy of force and combination of fire:—

The field gun is not suitable for the destruction of overhead cover, nor the howitzer for mowing down troops in the open, nor the heavy gun where mobility is required.

Again, some field guns must retain their mobility, others may risk the loss of it; some guns must watch the enemy's artillery, other

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guns may devote all their attention to the point or points of assault. Some guns must specially watch over the safety of your flanks against counter-attack.

We do not want a brigade to do the work of a battery, nor a battery left to cope with the work of a brigade.

If we are to obtain a scientific combination of fire, with due economy of force, the existence of a central guiding hand seems necessary.

(b). Allotment of tasks:—

I do not believe that our object is to be attained by partitioning the country into zones of action or fire, but I do believe that a careful allotment of tasks is very necessary, and also the retention, so long as possible, of a strong mobile force of artillery in the hands of superior authority.

(c). Retention of control and mobility:—

I do not mean by this that a portion of the artillery should necessarily be held back with the reserve and should remain unemployed, but that the control of it should not be allowed to devolve on subordinate commanders, and that it should not be permitted to lose its mobility.

Supposing for example that a General-Officer-Commanding decided to attack with two brigades of infantry and hold one in reserve. He might decide to allot a brigade of field guns to support each of the attacking brigades. The control of these two brigades would devolve upon the infantry Brigadier-Generals, and the artillery Brigade commanders would presumably act as their C.R.A's. The Brigadier-Generals would probably issue such instructions for the disposal of their artillery as would ensure at any rate a portion of the guns retaining their mobility.

Guns, the control over which has in this way devolved upon subordinate commanders, may be said to have quitted the fold, and the General-Officer-Commanding cannot count upon being able to resume control over them during the action, in fact there is a danger of misunderstanding and confusion arising from an attempt to do so.

Meanwhile the General-Officer-Commanding would retain in his own hands the control over more than half of the artillery force presumably available, *i. e.*, over one brigade of field guns, one brigade of howitzers and one heavy battery. The executive control would be exercised by the artillery Brigadier-General.

Although these guns would probably be employed, every effort would be made to maintain their mobility as long as possible.

The General-Officer-Commanding thus retains the power of intervening effectively in the struggle with artillery fire.

In allotting guns there are obvious advantages in retaining an artillery brigade intact; at the same time a battery is very self-contained. In venturing to give you this example to illustrate my meaning, I do not wish you to infer that, in my opinion, guns must always be allotted by brigades.

The paragraphs shown by a vertical rule were added subsequent to the first lecture.

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XII. General Remarks on Artillery in Defence.

My remarks, hitherto made with more special reference to co-operation in attack, are intended to be generally applicable to defence.

Central control over artillery action and inter-communication between arms are here equally important to ensure effective combination of fire and timely support, especially in counter-attack, whether local or main.

The reasons already given which influence batteries in trying to preserve concealment in the early stages of the attack apply with greater force to artillery action in defence.

The artillery of the defence has presumably but little to gain by engaging in a long distance duel with hostile guns. But it is bound to try and crush these guns, should they rashly expose themselves, and retard them as long as possible from occupying positions favourable to effective fire.

XIII. Artillery Action against Advancing Infantry.

In considering the action of artillery on the defence, and dealing with the advance of hostile infantry, we must remember that this artillery will, in the early stages of the advance almost certainly fire from concealed positions.

(a). Probable character of artillery action:—

This does not render the artillery task an easier one, and it is more than ever probable that the artillery will endeavour to bring sudden bursts of heavy shrapnel fire to bear, as occasion offers, on ground in the vicinity of certain predetermined points.

This is, at any rate, essentially the action which you may anticipate from Q.F. artillery trained after the French school.

(b). Why infantry should utilise speed and avoid land marks:—

With a view to this the artillery will take all possible steps beforehand to ensure accuracy of range and fuze. It may not succeed, but it is as well to avoid prominent land marks; and to take as little time as possible in passing over exposed ground.

If you only give artillery time, they are fairly certain to obtain your range; utilise speed, and it is by no means so certain.

(c). Effect of ground:—

Smooth, gentle slopes favour gun shrapnel fire. In connection with this, I may remark, that whereas the howitzer is far superior to the gun for searching steep hidden slopes, the gun is the weapon to employ for searching unseen ground where steep slopes are not likely to exist.

If you utilise cover, the opposing artilleryman at his observing station will probably have considerable difficulty in picking up his target, and if he only sees a few men at a time, he may be in doubt whether to pour out his ammunition or wait for a better opportunity.

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(d). Effect of light:—

Bad light interfers with observation of fire and nullifies the long ranging powers of our gun.

(e). Effect of formation adopted:—

Large concentrated formations are out of the question under the fire of Q.F. guns. Uniformity in formation renders the task of the artilleryman in arranging for distribution of fire less difficult.

It is a great advantage to us if the guns are all given the same range, or in other words, if the range to different parts of the target is the same.

Whether the formation adopted consists of irregular and extended lines, or small scattered columns, or file formations, &c., appears to make but little difference to artillery effect. Judging from practice camp results, I never know which to marvel at more, the small effect produced by quick-firing guns under circumstances unfavourable to the artilleryman, or the crushing and overwhelming effect which may be produced when the circumstances are in his favour.

(f). The occupation of direct fire positions:—

Quoting from "Field Service Regulations." "When the "enemy's infantry attack is pushed home, artillery which has with- "held its fire or has been compelled to cease fire must reopen against "it at all costs. At this stage artillery must occupy direct fire posi- "tions, and this will rarely be possible unless these have been pre- "viously prepared and occupied."

How are the positions to be occupied?

The weight of our field artillery gun and its carriage is 24 cwt. —its wagon is still heavier.

To run up guns and wagons by hand is, therefore, a laborious process on any but favourable ground, and the detachment may be exposed to heavy fire whilst so doing.

At the same time, presuming that firing has previously taken place from concealed positions, the time of its being put into execution should not be at once apparent to the enemy. In some cases a dash with horses might be feasible, and would be advisable as constituting a quicker process.

The risks incurred in occupying these direct fire positions may be so great that we must on no account unduly delay the time of execution.

This leads to the question of whether direct fire positions under the circumstances presumed by "Field Service Regulations" should not be occupied before the commencement of an action, the guns thus employed being concealed and not unmasking their fire until the later stages referred to. Ground and special circumstances may render this course advisable, but as a general principle I think it should be avoided.

The services of such guns are lost during a large and important part of the struggle—in fact they may never be employed at all.

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They enter into action at a time, when the enemy has, presumably, succeeded in obtaining some ascendancy in artillery fire, and at a time when the value of artillery fire is rapidly losing in importance in comparison with rifle fire. They are rendered immobile and cannot be extricated in case of necessity. For better or worse, I think that we must trust to careful previous preparations to enable us to occupy previously prepared direct fire positions, if the ground cannot be swept by direct fire from other parts of the position.

XIV. Artillery Action in Enclosed Country.

I propose to terminate with a few remarks on fighting in enclosed country.

I think it is safe to say that if it was only in enclosed country that we were called upon to fight, artillery—equipment, organisation, and methods of employment would all undergo considerable modification.

(a). Effect on equipment:—

In the first place, the importance of mobility bulks larger and that of range less.

We should require as a field gun, a light, very rapid firing high velocity gun, one for which we could more easily carry a larger number of rounds of ammunition.

We should have to rely on the intensity of fire which could be developed from a few such guns in a short space of time.

(b). Effect on organisation:—

Where could we find the space for the enormous quantity of horse-drawn wagons and ammunition columns which clog our movements? It is even doubtful in such a country whether we would find suitable space for all the requisite observing stations and gun positions.

(c). Effect on control:—

Open ground lends itself to field of view and communication on which central control so largely depends. Enclosed country is unfavourable to the same and consequently, to ensure co-operation, the control of a larger proportion of the artillery would early devolve upon subordinate commanders.

Batteries would often have to be employed where under other circumstances we might employ brigades, and sections where we employ batteries.

(d). Close support and use of iniative:—

The necessity for the display of enterprise and initiative on the part of junior artillery officers would be more important than ever.

Generally speaking, the closer the country, the closer must be the artillery support. To ensure this, guns might often have to be pushed forward by hand, and the action of a single Q.F. gun in bringing oblique fire to bear might decide the fate of a local action.

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(e). Concealment:—

Concealment would be of as much importance as ever, though the means of obtaining it would naturally undergo modification; hedges, woods, trees, &c., playing a much more important part.

Whole districts of England consist of something between towns and villages, districts of scattered houses. Without the aid of artillery, infantry would find progress difficult and costly, and I think that the want of some special high explosive or incendiary shell would soon make itself felt.

(g). Action in defence:—

In defence, the rôle of artillery would largely consist in sweeping approaches at comparatively short ranges, and, as in the attack also, in a vigorous, close support of the other arms, in full knowledge that the risk of loss of guns must be freely incurred.

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Pack Artillery compared with Field Artillery for the Territorial Force

By CAPTAIN A. E. C. MYERS, R.G.A.

HAVING had ample opportunity during the past year of seeing brigades of both field and pack artillery of the Territorial Force at work, and of witnessing the whole of their practice, one can give an unbiased opinion as to the comparative merits of both systems for the Territorial Force.

It would be as well, however, to start by recognising the limits of the use of all Territorial artillery. Everyone, including Territorial officers, are agreed that Territorial artillery could not cope with European artillery in a continental war, if used as units. Any Territorial Major, if asked how his battery would fare against a regular battery would give the same answer.

A Territorial battery cannot compete with a regular battery, still less could a Territorial brigade compete with a regular brigade, and the larger the force of artillery employed the greater the odds against the Territorial artillery.

As a reserve for the regular artillery, they would be most useful, despite the different equipment, but not as units.

For purposes of comparing field and pack artillery then, one can consider both as for home defence and for use in the United Kingdom only.

Now for the Territorial Force, the more technical the training, and the more there is to learn, the more difficult is it for the Territorial unit to become efficient; consequently the less they have to learn, the better.

Now here is the huge advantage the pack artillery has over the field artillery for the Territorial Force. *There is no riding and driving to be learnt*, except that officers and a few specialists ride.

I often think that it is not generally recognised what an enormous addition this horse management is to an amateur gunner, who has already so much to learn in the ridiculously inadequate time allotted to him in the year. As it is, there is to begin with the riding, teaching men to stick on their horses, the driving, and the manœuvring; then there is the actual drill of the gun, laying, rangetaking, signalling, and the all-important fire discipline, and finally a third lot of duties, such as camp life, feeding, watering, grooming horses, cleaning and fitting harness, care of technical equipment and ammunition.

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Now if you take away the riding and driving, as you do with pack artillery—as the animal is merely led—you cut out a tremendous amount of work from the training and give much more time for other duties, and, moreover, when it comes to fighting you give the batteries less chance of going wrong under fire and being inefficient in action. Anyone who has seen some of the Territorial batteries for the first week in camp—and some the last week—with just four guns and four wagons trying to come into action, on quite an easy position, will realise what I mean. I am not in the least wishing to throw a slur on the Territorial field artillery, as considering the time at their disposal, some of the batteries were wonderful and reflected the greatest credit on those responsible for their training.

Not having to learn riding and driving is the greatest advantage pack artillery would have for the Territorial Force, and is practically the gist of this paper, but there are one or two other points.

It is not my intention to go into the usual stock arguments for or against pack artillery, such as cheapness, better concealment, smaller target, smaller shell, less range, slower pace, &c., but just to touch on those points affecting the case from a Territorial Force point of view.

Surely cheapness ought to count in this connection.

As regards less range, ranges in the United Kingdom would not as a rule be very long. As regards smaller shell, if the new gun is brought into use, there will not be much difference, and, moreover, an invading or raiding force would necessarily be short of artillery and we should hope to make up in numbers what we lack in efficiency and equipment.

As regards manœuvre, I think in the United Kingdom, cut up as it is with hedges, banks, woods, ploughed fields, crops, &c., pack artillery would be by far the easier to move about, and, moreover, the field artillery from want of experienced drivers, and the fact that the horses would be neither used to the work, nor of working together, would probably often get into trouble if the ground was at all difficult.

As a matter of fact during the training in 1909, the pack artillery showed in no unmistakeable way that they could practically go anywhere, and did take up positions absolutely impossible for field artillery.

To sum up, the object with the Territorial Force should be to make for efficiency in the short time available for training, and there can be no doubt that it is far easier to make amateur pack artillery efficient than amateur field artillery. It is not advocated that the whole of the Territorial artillery should be pack, but there should be at least one brigade per division, instead of one brigade for the whole of the Territorial Force.

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The use of Pack Artillery in Civilized Warfare.

By LIEUTENANT P. C. CHAPMAN, R.A.

PACK artillery is at present represented in the British army by:—

1. Eight batteries of the mountain division of the Royal Garrison Artillery, all of which are stationed in India.

2. Twelve batteries of Indian Mountain Artillery, belonging to the Indian Army, and stationed in India and Burmah.

3. The Mountain Artillery of the Territorial Force, which has only lately come into being.

We have, therefore, no pack artillery of the regular army at home, and consequently the importance of this form of artillery is sometimes apt to be overlooked. Our mountain artillery in India is armed with the 10-pr. jointed gun, which can hardly be said to be up-to-date, when compared with the mountain guns that some of the Continental armies are armed with. It is, however, very well adapted to the work that it is at present required to do in India, but as that is not civilised warfare, it does not come within our scope.

"Field Service Regulations" enunciates the characteristics of mountain artillery as follows:—

"Mountain artillery is the (form of artillery that is) weakest in "shell power. It is peculiarly suited for operations in close, broken "or hilly country. In level country it may be moved with compara- "tively little exposure, owing to the facility with which it can take "advantage of cover. It can, therefore, often be used in support of "infantry at shorter range than either horse or field artillery."—Part I., Sect. 4(7).

By close country is understood comparatively level country, *i. e.*, not mountainous, intersected by hedges, walls, banks, ditches, streams, or wooded country; such country, in fact, as the greater part of England, and large portions of continental countries, consist of.

Broken country means country that is cut up by deep ravines or nullahs, such as one finds in the northern plains of India, or indeed anywhere where heavy rains have carved for themselves deep waterways with precipitous sides.

Broken and hilly country is met by our mountain batteries in India, but we have no pack artillery stationed where it has an opportunity to show its ability to get across close country.

Pack artillery has several advantages over wheeled artillery.

1. If disabled by accident it does not block the road to the same extent.
2. It can get through narrower passages.

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3. It can cross foot bridges that would not stand the weight of field artillery.
4. It can get through woods that would be impassable for field artillery.
5. It can get quickly through fences or hedges that would delay field artillery for some time.
6. By using tarpaulins, and other means, it can cross swampy ground in which field artillery would get stuck.

Pack artillery is, moreover, less likely to be put out of action by losses than field artillery. When it is necessary to cross a fire swept zone, and there is no urgent need of haste, individual mules can be trotted separately through the zone of fire. Thus either the enemy's fire will not be drawn to the same extent as it would be by a gun team, or else, if casualties occur, they are not so destructive. Under these circumstances a lucky shrapnel shell from the enemy would put a field gun out of action, by disabling the team and detachment, whereas with pack artillery adopting this "dribbling" method of advancing under heavy fire, a lucky shrapnel need only kill one mule and his driver.

The facility with which pack artillery can take advantage of cover is due to:—

1. The fact that there need be no mounted men with the battery, and that, therefore, the greatest height in the battery is that of the tallest gunner.
2. The fact that the line of a wall or hedge or bank can be followed very much more closely by independent animals, than by a team of six horses with a long gun behind them, a total of about twenty yards in length.
3. The fact that pack artillery can move along the bed of a stream or ditch, while wheeled artillery might have to move along the bank of it.

Against these advantages must be set the disadvantages of low shell power, and of comparative lack of pace, and of rapidity in coming into action.

The lack of pace is, however, confined to movements across good country, or along good roads. Pack artillery can keep pace with any infantry. The march of the ammunition mules from Datta Khel to Maizar in 1897, when nine miles were covered in ninety minutes in the daytime during an Indian hot weather, is enough to show what can be done when necessary.

The first and most obvious duty of pack artillery in battle, is to take the place of field artillery in those portions of the field which are inaccessible to that arm.

In attack, the chief duties of the artillery are:—

1. To assist the infantry to obtain superiority of fire.
2. To enable the infantry to close with the enemy.

In order to obtain superiority of fire, the infantry have to advance to close range. Field artillery can render them more material assistance while they are advancing than pack artillery can, because of its greater shell power.

If pack artillery pushes up with the infantry to the position from which it is intended to establish superiority of fire, it will be able to

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do much to assist them. Very possibly the ground will be such as to enable mountain batteries to reach a position within close range of the enemy under cover, either by creeping along the beds of streams, or behind banks or hedges, or by hiding their movements by approaching through woods.

When the pack artillery has established itself at close range, it will be in a position to check the enemy at once, should he attempt to deliver a counter-attack. This he is almost certain to do, unless he is fighting a merely holding or delaying action. The need for artillery in close support of the infantry is a very real need, and under certain conditions, field artillery will have great difficulty in getting close to the enemy without suffering heavily. Pack artillery, on the other hand, by making the utmost use of cover, may often be able to get comparatively close to the enemy before its advance is discovered.

The moment when the infantry is about to deliver the assault is perhaps the most critical moment of the battle. It is essential that the artillery should continue their fire until the very last moment, so as to keep the enemy's infantry down in their trenches until our own infantry reaches them. When the artillery commander is at some distance from the point to be assaulted, it is difficult for him to distinguish the infantry approaching the hostile position. But the battery commanders of pack artillery which has been pushed forward to close range, will be able to see the infantry clearly, to co-operate with them thoroughly, and to continue their fire until the last possible moment. By coming to a previous arrangement with other artillery commanders, they might be able to indicate to them the moment to stop firing, and so convey some of the advantage of their forward position to batteries that were not able to get so close to the enemy.

As soon as the assault has been successfully carried out, artillery is required on the captured position to keep the enemy on the run, and to prevent him from taking up a second position. The captured position will in all probability be defended by wire entanglements, abattis, ditches, and banks, which will not present such difficulties to the passage of pack artillery as they will to field artillery. Pack artillery should, therefore, hold themselves in readiness to advance on to the captured position directly the assault is delivered, and, owing to their advanced position, they will be favourably placed for doing this. Horse and field artillery will, however, be required to push the pursuit beyond the captured position.

For very similar reasons it would seem that pack artillery is the most suitable form of artillery to allot to the counter-attack when acting on the defensive. It will emerge more easily from the position, it can take greater advantage of cover than field artillery, which by reason of its greater shell power, is more suited to supporting the counter-attack from the main position than is mountain artillery. "Field Service Regulations" tell us, however, that even when the counter-attack can be effectively supported by artillery fire from the main position it will generally be advantageous, from a point of view of moral, for some guns to accompany the infantry, so as to be able to come into action at close artillery ranges. Pack artillery seems to be the most suitable form for this duty.

"Concealment and cover from fire are important factors in "defensive operations." But when the enemy's infantry attack is

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pushed home, the artillery of the defence "must occupy direct fire "positions, and this will rarely be possible unless these have been "previously prepared and occupied." At the same time, it is more easy for pack artillery to occupy a direct fire position by the "deliberate" method than for field artillery. The guns can be brought into action nearer to the crest of the hill, owing to no men having to be mounted; the gun has, therefore, not got to be run up so far; as the gun itself is lighter, it is easier to run up; and there are no wagons or limbers that have to be run up. Ammunition can be brought up from under cover by the higher numbers of the gun detachment as required.

So far we have considered the rôle of pack artillery in battle only. In the minor phases of warfare there may often arise conditions, when the possession of pack artillery may be a great advantage to its side.

Possibly the most noticeable of these conditions is when strong flank guards are required. The roads by which large forces move are, as a rule, quite practicable for all arms; but the minor roads, running parallel to the main roads, may present great difficulties to the movement of wheeled artillery, and may yet be comparatively easy for pack artillery.

When it is necessary to disembark artillery on a hostile shore from boats, pack artillery will have great advantages over wheeled.

In night operations pack artillery is, as a rule, more easy to move across country than field artillery, and it makes less noise in doing so.

In siege operations pack artillery can be brought up to close ranges along the saps. This is impossible with field artillery.

We have now examined some of the occasions in which the use of pack artillery would be advantageous in warfare, where at present we are content to rely on wheeled artillery. We have not, however, carefully examined its obvious rôle, of replacing field artillery in parts where the scope of the latter is limited by the nature of the ground. Such places do undoubtedly exist in countries where civilised warfare may be waged, though not perhaps in parts that are likely to come directly under our influence. The great Lowland Plain, of which Great Britain is an adjunct, comprises the North of France and Germany, the Netherlands, Belgium, Denmark, and stretches away into Russia. Our immediate neighbourhood, therefore, is comparatively low lying, so that mountain artillery, as such, is perhaps out of place, though pack artillery may be very valuable. We must, however, be prepared to be drawn into war in other parts of Europe than these, through obligations to our allies, and theatres, such for instance as the Spanish Peninsula, the eastern frontier of France, the North of Italy and the Tyrol, exist, in which mountain artillery could play a very useful part. These have all been theatres of war in the past, and may become so again. We may also be called upon to fight civilised foes in our colonies, and possibly in India, and there the terrain is often difficult for wheeled artillery.

But above and beyond all, whether in hills or in plains, the chief duty of pack artillery is to get as close to the enemy as possible, and to give the utmost assistance to the infantry.

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The Strategical Situation in the North Sea and The Baltic.

(The substance of a Garrison Lecture delivered at Portsmouth on January 28th, 1910).

By LIEUTENANT K. B. FERGUSON, R.G.A.

I. The Situation.

The strategical situation in the North Sea and the Baltic directly concerns four great Powers:—Russia, Germany, France, and Great Britain,—and five lesser ones,—Norway, Sweden, Denmark, Holland, and Belgium. Leaving out Great Britain for the moment, we find that of these three great Powers, two are in alliance against the third, which has the powerful support of Austria; while of the five lesser States, not one has any striking naval or military strength, and there is no compact between any two of them.

The Baltic:—

We shall deal first with the Baltic States. Sweden looks back upon military records of exceptional grandeur in the days when Gustavus Adolphus, one of the greatest soldiers of his day, led her troops on many a victorious field, and when, later on, another brilliant but unstable ruler, Charles XII, led them against the Russians under Peter the Great. Since then, however, her glory has faded away; and she is now numbered among the lesser States without any hope of reasserting authority against the formidable neighbours by which she is surrounded.

Norway is in a still less independent position. Her population ($2\frac{1}{2}$ millions), and revenue are only about half those of Sweden; and if Sweden, the predominant partner under the union which broke up four years ago, is unable to hold her own, Norway is much more decidedly so. Both Swedes and Norwegians are well known to be fine types of men, of the very best to be found in Northern Europe. But from a military point of view, neither of the two Powers has great weight in European Councils, and another weak point about them is that that insidious form of Socialism which is spreading over Europe appears to have taken a strong hold over them, threatening to become a clog upon their commercial development and still more upon the growth of their land and sea forces.

The army of Sweden, based upon universal military service, has a peace footing of about 50,000, at a liberal estimate; on mobilisation it is supposed to expand up to 400,000 or 500,000; but these figures must be taken with some reserve. Norway has a peace footing of 25,000 or 30,000, expanding up to 100,000.

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Denmark is also reorganising her forces, and whereas at present her peace establishment is about 13,000, she hopes shortly to be able to mobilise an army of rather more than 80,000 men on a war footing. But in Denmark also, Socialism, with the disarmament policy of which we have heard so much in our own country, has made dangerous progress. One of the two parties in the State has always resisted military expenditure strongly, and as it has been returned to power in force, it is working for further reductions. This anti-defence party maintains that in time of war Denmark need only proclaim her neutrality, and abide by it. Their adversaries naturally reply that this may be impossible if an enemy should force their hands, and that they ought to have the power to resist any such aggression. In March, 1909, the Prime Minister startled the Danish House of Commons by asking for a credit of nearly 2½ millions for land and sea fortifications, and for the construction of torpedo boats and submarines. He passed his Bill, and the programme will eventually be placed in hand; but meanwhile neither of these three Powers has any naval force worth considering. Sweden is the strongest, with ten coast defence vessels and forty torpedo craft and fifteen to twenty more under construction.

Apart from them there is Russia. We shall shortly deal with the land forces of Russia, as far as they concern our subject. Her naval power in the Baltic is uncertain. She has only two battleships and eight cruisers there, but is strong—on paper—in torpedo craft and submarines, with about 120. As Sir William White has pointed out, however, a defective system of administration overshadows all that is done in Russia. We read in the "Naval Annual for 1909" that a special Commission, including the Ministers of War, Marine, and Foreign Affairs, was appointed in March, 1909, for the reorganisation of the national defences, including the preparation of a shipbuilding programme. But special Commissions sometimes have a singular aptitude for doing nothing. In this case there has been no result so far, and it is safe to say Germany has little to fear in the Eastern reaches of the Baltic for many a long day to come. Meanwhile the Duma strongly refuses to vote money until there is some sound prospect that good will come of it.

Over against these four Powers, which are individually weak, and between which there are no bonds of union, Germany stands in a position of very great strength. They cannot put together half a dozen battleships, or even strong cruisers, between them; and although on paper they have considerable numbers of smaller craft, Germany has the twofold advantage of a homogeneous fleet, and one which is systematically and thoroughly trained. It is no exaggeration to say that the Baltic Sea can be considered as a German lake. Of the two entrances to that Sea, by the Belts and by the Kiel Canal, she controls one absolutely, and the other also so effectively, that it may be doubted whether even we would venture to send ships of war into such a trap, from which there is every likelihood that they would be unable to make their way out again, even if successful and unharmed. The navigation of the Little Belt is always a matter of some difficulty. In the stress of active operations this difficulty would be very much greater, and a Power as strong as Germany

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could make it almost prohibitive. The Great Belt is the easiest passage of the three between the North Sea and the Baltic; but it is only 10,000 yards across at its narrowest point, and though Denmark leaves it undefended, Germany could also control that passage. The Sound is guarded by the defences of Copenhagen, and the present intention of Denmark is to concentrate her resistance in Zealand and defend her capital to the last point. Denmark hopes that neither we nor any one else will try to pass the Great Belt and violate her neutrality; but if we did, and she were too weak to prevent it, a Power like Germany would be perfectly justified in taking her own measures to enforce the neutrality of these Straits, and it may be doubted whether even we could defy her. Therein lies the advantage of her amphibious Power. As a naval Power she can close the Baltic; as a military Power she can grasp Denmark by the throat and enforce the neutrality of the Belt either through her, or in spite of her.

The North Sea:—

Turning now from the Baltic to the North Sea, we come first to the West coast of Denmark; but that does not call for closer comment, because it is bare, rocky, and so dangerous for navigation, that it is not likely to be considered as part of any strategical scheme. Leaving out the western seaboard of Germany for a moment, only to come back to it with the greater emphasis, we come to the last two of our five lesser powers—Holland and Belgium. Both are of immense strategical importance. To realise their importance in some measure, try to imagine both of them annexed and administered either by Germany or France. Think what it would mean to Germany if the dominion of France extended up to Emden and the mouth of the Ems; if France controlled the lower reaches of the Rhine and erected a wall of tariffs to keep back that volume of German trade that rolls down from Bavaria and Württemberg through the Rhine Provinces to Rotterdam. Or think what it would mean if Germany became predominant all along the coast from Schleswig-Holstein to within twenty miles of Dunkirk; what it would mean to France; what it would mean to Great Britain. Fortunately there is little likelihood of such a tremendous extension either one way or the other.

The peace establishment of Holland is about 30,000, expanding in time of war to 75,000. Belgium has a more powerful army, its effective war strength being about 150,000. The chief military arsenal of the kingdom is Antwerp, which by its natural geographical position might be used either as a base of resistance to attack from the east, or as a base for offensive operations in the opposite direction, against us. Belgium has an efficient and well-equipped army, which is likely to play an important part in the next international conflict in Europe, but she has no navy at all. She is perhaps the most important buffer-State in the world. Her frontier runs 180 miles inland from the sea, and only leaves 120 for the Franco-German frontier down to Switzerland. That creates a very serious temptation to an overwhelming military Power to transgress her neutrality; in which case the Belgian army and the strong defensive belt around Antwerp would acquire great importance.

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France is such a familiar factor in this strategical situation that detailed information about her is unnecessary. In our rapid survey we shall only notice two points; first, that the "Ascendency of France" is a thing of the past; secondly, that the traditional rivalry and mistrust between her and Great Britain is apparently also gone. It is not so much a matter of diplomacy as of necessity. They stand in too urgent need of one another now to have time for bickering. If France were involved in another war with her enemy of 1870, she would need our moral support, even if she could not claim anything more than that. Conversely, there are many other people besides Mr. Blatchford who see that "the problem of British defence is the defence of France," which I take to mean that if France is weak, Germany can put pressure upon her to force our hands—can say to us figuratively, "If you hit me, I hit France."

And now what of our own strategical position? In coming down the coast from the Baltic just now, I purposely passed over the western seaboard of Germany, from Emden up to the frontier of Jutland. We must return to it now, and consider it in conjunction with our own island. It is a narrow strip of land; in round figures 100 miles on either side of the mouth of the Elbe; the coast line forming what we call in strategy a re-entrant, with Heligoland thrown out as an advanced post guarding the entrance to it. Think for a moment what naval, military, and commercial interests are there; Hamburg and Bremen are the London and Liverpool of German trade and shipping; the figures of tonnage entered and cleared in Hamburg last year are surpassed only by those of London, Liverpool and Cardiff, and they are ambitious growing ports. Cuxhaven and Wilhelmshaven are two great naval bases; Wilhelmshaven in particular, which has now become the chief base of the German navy in the North Sea, is an arsenal and stronghold of the first importance. Opposite Cuxhaven, and on the way up the river to Hamburg, is the western outlet of the Kiel Canal, the strategical waterway which links together the western and eastern seas, giving German warships a safe covered passage from one to the other without going round the coast of Denmark. Backing all these naval and commercial strongholds are the head-quarters of two Army Corps, a force of 50,000 troops on the spot, without counting any reinforcements; thrown forward to guard them all is Heligoland, not in itself a strong fortress, but of great strength if taken in conjunction with the rest of that important seaboard.

If we have grasped the significance of that western seaboard of Germany, we can see by a glance at the map that Great Britain holds a position in front of it which is also of unique importance. She lies right across the line of communications by sea between Germany and the outer world. In time of war, German ships coming up the Channel and through the Straits of Dover would be at her mercy if she held command of the sea; even if they came round by the Shetland Islands they would still be exposed to capture, for our cruisers would be on the look-out there. War between Germany and the United States is one of those possibilities with which statesmanship has to reckon, and it is conceivable in such a case that we would be on one side or the other. If we were supporting Germany

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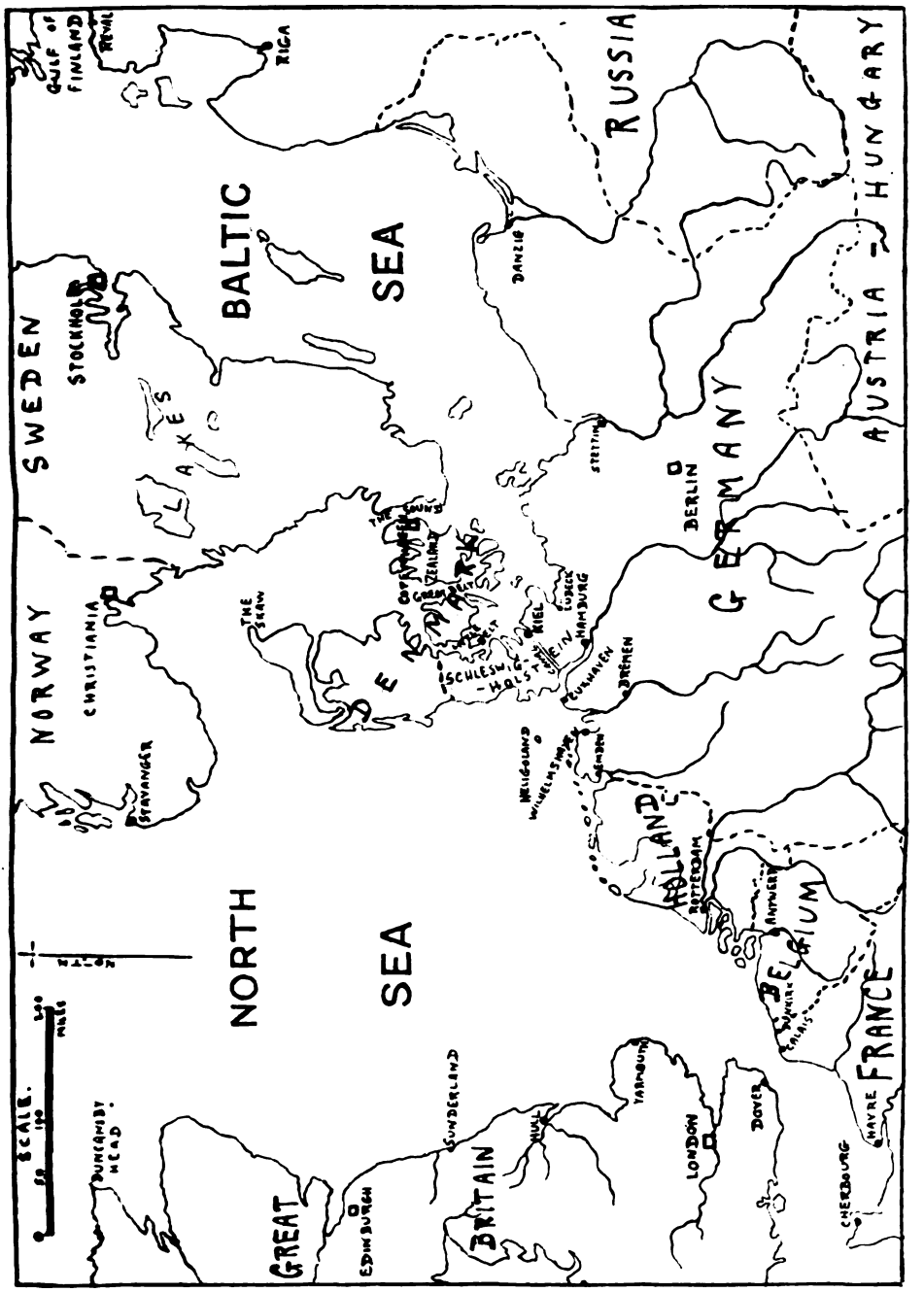

her position would be impregnable, for Great Britain would become a huge Heligoland barring all access to her from the West; on the other hand, if we were supporting the United States, not a single German ship could go west of Duncansby Head or the Straits of

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Dover until our naval power was broken, because we would command the line of communications. Germany cannot afford to ignore this; nor can we. And if it be true, as the German Emperor said on a historic occasion, that "Unsere Zukunft liegt auf dem Wasser"—Our future lies upon the Sea—we must bear in mind that we lie straight across the path of Germany, and that consequently, to quote the German Emperor again, she must in self-defence try to make her battle-fleet "so strong that a war with her would, even for the greatest naval Power, be accompanied with such dangers as would render that Power's position doubtful."

Two questions now arise: Are we secure against attack from the East, and is Germany secure against attack from the West? The ablest strategists have told us we are not secure. Lord Roberts holds that the invasion of these islands is possible; Lord Wolseley, perhaps a still more profound student of war, was of the same opinion; and Moltke said he could find twenty ways of getting troops into England, though he confessed there might be great difficulty about getting them out again. We have ships enough to picket the coast, between 2000 and 3000 yards apart, from Dover right up to the Orkneys, if anybody thinks that is expedient. Perhaps no hostile ships could get through unseen; but we would be violating those elementary principles that are laid down in the opening words of Chapter 7 of our "Field Service Regulations," Part I., "Decisive success in battle can be gained only by a vigorous offensive." Our navy must not be tied to the coast as a sort of floating Portsmouth; and if it is to have perfect freedom of action to strike at the enemy's own gates, we must have some means of warding off attack without assistance from our ships. Consider the second question for a moment—whether Germany is secure against attack from the West. Has anybody ever suggested an invasion of Germany by us? The idea is unthinkable. Panic mongers in Germany have talked of British troops landing in Schleswig-Holstein, but an English invasion of Germany is not a serious strategical problem in the same sense as a German invasion of England. Yet why is this? Is not our navy twice as strong as hers, strong enough to support an expeditionary force? Have we not five times as many ships as she, available for purposes of transport? The difference lies in military strength; and as battleships can neither climb hills nor cross open country, Germany is secure against all the navies of the world because she has made elaborate arrangements of roads, railways, sidings, and canals, which enable her to concentrate anything up to 100,000 trained troops at any point on her coast within as many hours as it would take the very promptest enemy to approach and effect a landing. We have not done this. Our East coast, which faces that formidable triangle at the mouth of the Elbe, is exposed and undefended; nor have we the trained troops to meet a sudden crisis. But to this we shall presently return.

To sum up our situation; of the five Baltic powers, three are very weak, and ask only to be allowed to remain neutral in case a European war should break out. One, Russia, is very weak at sea, but strong enough on land to exert a strong influence upon European affairs, only while her Government remains so chaotic, she can never

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put forth her tremendous strength with any effect. The fifth, Germany, is mistress of the Continent; all powerful on land, and so strong at sea that the Baltic, as we said, can be considered a German lake. Of the Powers in the North Sea, Great Britain and France look eastwards at the great Power that has grown in Central Europe, and join hands with Russia on the far side to check her ascendency. Holland and Belgium, in a strategical position of the first importance, are also concerned to preserve their neutrality. Great Britain, commanding both outlets westwards from the North Sea, is a standing barrier in the way of Germany, against which the latter State must protect herself.

II. The Solution.

The salient feature in this general situation is the predominance of Germany; and she is already such a menace to the balance of power in Europe, that the problem before us and the rest of Europe is, how to maintain that balance of power.

There is more than one conceivable solution to this problem. One is the rise of another great leader in France; Germany, though stronger than she, is not so much stronger but that a leader like Napoleon or Marlborough would turn the balance in favour of France.

Another solution, more remote, is the awakening of Russia; no man can tell what the future may not bring forth in that wonderful and little known country.

A third is the dissolution of the Triple Alliance, if Italy were to fall away from her uncongenial partnership with Austria-Hungary.

I am not concerned with these solutions, however, but with another which is much nearer to my heart, the expansion of our own military power. When we have a strong national army behind our strong navy, the balance of power will be redressed; until then it will be in danger.

We want a strong army for two distinct purposes. One is the defence of our country, the other is the support of allies on the Continent. Reams and reams have been written about this already, yet it is doubtful whether the average Englishman—the average one of those 7½ million voters who were recently writing another page of English history—realises why an army is necessary to us. We want it first for the defence of our country, because coast defence is not the true function of the navy, whereas it would be no strain on the country to maintain a national force of such strength as would make any offensive operation against Great Britain quite impossible. Was it not Lord Fisher who once said that our naval frontier is the enemy's shore? And if so, could we venture to fling our fleet out on a great offensive stroke at the present moment, leaving only the troops we actually have in the United Kingdom to resist a counter-stroke? It would never be allowed. In spite of all we say and know about the offensive in strategy, our strategy at present is purely defensive. Most of the 7½ million voters and the other voteless millions whom they represent, look upon the navy only as a barrier which no enemy can pass, and never think of it leaving our shores to go and strike at those of a foreign Power.

There is another point. Those of us who have read, though ever so little, about the Russo-Japanese war, will remember the

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peculiar influence that the presence of a Russian fleet in Port Arthur had upon the course of operations. After the death of Admiral Makaroff it became worthless as a fighting force. It never seized the initiative once throughout the war. It appears to have been ill-disciplined, untrained, wholly devoid of courage, patriotism, and dash. Yet even this fleet, crouching in Port Arthur, fearful of the enemy's approach and of the perils of a fight at sea, this fleet, by its mere existence, was a menace that the Japanese could never ignore, and they never rested till it had been dragged out to sea and scattered.

What does this teach us? The moral I have always drawn is, that if we had a strong army in these islands, our navy might go off bodily and chase the combined fleets of Germany and France as far as the Mediterranean, but not a single foreign Army Corps could land here. Our army need not be numbered in millions, like those of the Continent. No serious and thoughtful advocate of national training, however enthusiastic, would advocate that. But it ought to number at least 500,000 trained soldiers without taking a single man, horse, or gun from the expeditionary force; and it ought to be instantly ready to repel attack at any point from Plymouth to Rosyth, with less than a week's notice, including the preliminary period of strained relations. If the Russian fleet in Port Arthur was a standing menace to the Japanese forces, this army in England would affect international operations even more profoundly, and make enterprises against this island impossible.

I spoke just now of two distinct purposes our army will fulfil. This is one, the defence of our country; the other is the support of allies on the Continent. We have had to support allies before, and we are likely to have to do it again. But many serious men abroad are asking themselves whether, in the present state of our forces, the friendship of Great Britain is not likely to be more of a hindrance than a help if a storm should break over Europe. On the title page of a book recently published in France, "Entre l'Angleterre et l'Allemagne," by a French naval officer, Capitaine Sorb, you will find this fear expressed in a most concise French way:—

Avec l'Angleterre: Amis? Oui.
Alliés? Non.
Avec l'Allemagne: Amis? Non.
Alliés? Peut-être.

If I were a Frenchman, I would endorse that opinion under present circumstances. But if Great Britain could send abroad 200,000 men of the stamp of our Aldershot Command, am I exaggerating if I say the whole strategical situation in Western Europe would be altered? Would either France or Germany dare to violate the neutrality of Belgium if our navy menaced her shores, and our army, based on Antwerp, menaced her northern flank? Draw a line from Paris to Berlin and another from London to Lille or Antwerp, and then, with the map in front of you, read Hamley on flanking positions. The moral is obvious.

Space forbids me to enter into details about the strength and composition of such a striking force. It has been carefully worked out in a recent article (October, 1909) in "National Defence"; whether he agrees with them or not, anyone of my audience who

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cares to study the conclusions reached in that article will find they give him a basis on wnich to form conclusions of his own. As I said at the outset, the most profitable way to study a question like this is to frame your own appreciation and work out your own solution, "War Establishments" and "Field Service Regulations" in hand. Only dismiss the idea that our navy can perform police duties and coast defence. The Regulations say "decisive success in battle can "be gained only by a vigorous offensive. . . . . Half-hearted "measures never attain success in war, and lack of determination is "the most fruitful source of defeat. . . . . The action of a "force which is content with warding off the enemy's blows is not "considered as an aspect of the battle." This is equally true of war and competition in every shape and form, great or small; and our Chief of the Imperial General Staff, Sir William Nicholson, in his memorandum submitted to the Imperial Conference last year, said the same thing no less forcibly: "It is a cardinal military maxim "that no organisation for defence can be regarded as adequate or "complete which does not contemplate offensive action."

Our fleet must be free in time of war to operate in the Mediterranean or among the West Indies, where of old it fought out imperial issues under Nelson, Vincent, and Rodney. If our army is not strong enough, and ready enough, to stand alone and leave it that freedom, there is something wrong with us.

I have endeavoured to frame a clear appreciation of the present situation, and to suggest a clear solution to the problem before us. In summing up now, two outstanding features call for notice. One is the ascendency of Germany in Europe; the other is the gravity of the situation for her as well as for ourselves. Her ascendency is complete and unmistakeable. Sweden, Norway, and Denmark, are completely under her authority, Holland and Belgium openly discuss the danger of annexation by her. France is afraid of her, Italy and Austria would have parted company and fought long ago had it not been for that impulse of fear that holds the Triple Alliance together. Only two Powers remain to some extent undaunted and hitherto unbeaten, Russia and Great Britain; and their future lies in their own hands. At the same time, we must not fail to notice the gravity of the situation for Germany as well as for ourselves. We have often heard it said that her geographical position is a weak one, because she is hemmed in on three sides by powerful neighbours. This is true; but there are two sides to every question. The position is a weak one for a weak Power; but it is a very strong central position for a strong Power, the kind of position Napoleon always tried to secure by dividing his enemies asunder to defeat them in detail. Domination is essential to Germany, and she is making a magnificent effort to secure it. I know nothing grander within the whole range of modern history than the rise of that Empire in Central Europe; certainly we, whose geographical position is a most fortunate one, have no conception of the misery and heart-burning through which she has passed on her way upwards. The wars of Frederick the Great were a fight against heavy odds, which involved much suffering and a great national effort. But these were as nothing compared with those awful days after Jena, when Napoleon scattered the forces

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of Germany in all directions from Lübeck to Königsberg, and drove the Prussian monarch and his court into flight. We can have no conception of what it must have been, and I know of nothing finer in history than the way that nation pulled itself together again after those dark days.

Now the tables are turned; and it would appear as though we were approaching another of those grave crises in European history in which, to quote the noble words of the younger Pitt, "England "saved herself by her courage, and saved others by her example." She has always stood up for the balance of power in Europe, and much of that universal dislike and mistrust of England which has always been noticeable on the Continent is due to the fact that she has successively resisted and broken the efforts of other great Powers to secure overwhelming dominion. It may be that she is destined to do it again; and even as Germany is straining every nerve to make herself fit and strong, to attain that position among the nations which is due to a nation that has suffered much but never yielded, so ought we to do everything needful to ensure our own position as well as that of weaker neighbours who will depend upon us when the time comes.

By all the laws of strategy, which we soldiers and sailors know as well as anyone else does, our navy must be free to leave these shores and fight far away from here, as it did at Trafalgar, St. Vincent, Quibeon Bay, and the Nile. Our army must be ready to fight abroad, as it did at Blenheim, Vittoria, and Waterloo, but this time against nations in arms, which are a new and tremendous foe to which past history offers no real parallel. And behind these two striking forces—what the imperial poet has called "our far-flung battle-line"—we must have a trained force, equipped with horses and guns, entirely independent of them, and so strong that an invasion of England by France, Germany, or Russia, would be just as hopeless as an invasion of France, Germany, or Russia, by us.

History teaches us a great deal, but we must be careful not to misapply her teaching. Some people, for instance, say that as Great Britain has always "bungled through" and eventually come out on top, it is no use fussing, for she will probably do it again. That is not the way to apply history. But we *can* learn from the past the proper functions of our fleet and of our army. We can also learn what true national statesmanship, or the lack of it, can do; the stately pages of Mahan and Fortescue show us all this if we care to learn.

Perhaps for the present it is hopeless to try to convince our countrymen that their future lies upon the land as well as upon the sea; but I cannot help thinking that if everyone of us ponders the matter for himself, we shall be so much better prepared if, in the fulness of time, the national awakening should come very suddenly. If we are fools to fear it, it is some satisfaction to be foolish in company with Lord Roberts, Lord Cromer, Lord Curzon, and Lord Milner; if we are wise, we shall look across the seas at our neighbours and cousins and give up the idea that "bungling through" will always be a privilege of ours.

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The Emoluments and Expenses of the Junior Officer during the period of the "Long Wars" of the second and third Georges.

By Col. H. C. C. D. SIMPSON, c.m.g., R.A. (retired list).

FOR the first time in its annals, it is believed, a term of Cadets have joined or will shortly join the Royal Military Academy, who have not been called upon to pass a competitive examination for entrance.

A similar state of affairs exists at Sandhurst. The time would, therefore, appear to have arrived when it behoves the authorities to consider the reason for this dearth of Army Candidates, which undoubtedly at present exists.

A general consensus of opinion appears to be, that the main reason for this deficiency is the insufficiency of pay of the officers in the junior ranks. Even in the least expensive regiments a 2nd Lieut. cannot live under an income of £200 per annum. It is scarcely fair to expect his parent or guardian to contribute more than one-third of this sum. His present rate of pay is £96 per annum. Consequently the State should be prepared to contribute the additional £38 per annum, or say 2/- a day as a minimum increase to the present rate, and to pay something towards his outfit expenses.

The matter will no doubt receive the consideration of the next Parliament, and in the meantime it may perhaps be not uninteresting to consider the question of pay and expenditure of the young officer during the long wars of the second and third Georges.

During the fifty years immediately prior to the Peninsular War the pay of the Regimental officer was as follows per diem:—

	£ s. d.		s. d.
Lt.-Colonel	1 0 0	Major	15 0
1st Captain	10 0	2nd Captain	6 0
Lieutenant	5 0	2nd Lieut.	4 0
		(Ensign 4d. less)	

In 1806 the pay of the Lieut.-Colonel was reduced to 18/1

On joining the service the young officer had to provide himself with the following kit, the items of which as regards under-linen would appear to have been on a fairly liberal scale. A frock suit

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of clothes, 2 frock suits, 2 hats, 2 cockades, 1 pair leather gloves, sash and gorget, fuzee or spontoon, sword, sword knot and belt, 1 pair of black spatterdashes and tops, 1 pair of shorts, 1 pair of gaiters, 1 pair of regimental boots, a case of pistols, a blue surtout coat, a Portuguese cloak, 6 white waistcoats, 12 white and 2 black stocks, 18 pairs of stockings, 10 handkerchiefs, 1 pair leather breeches, 6 pairs of shoes, 24 shirts, 8 towels, 3 pairs of sheets, 3 pillow cases, 6 linen night caps and 2 yarn ditto, a field bedstead and a painted canvas bag to hold it, bed curtains, quilt, 3 blankets, bolster pillow and 1 mattrass and palliasse carried in a leather valise, a travelling letter case to carry pens, ink, paper, wax and wafers, a case of instruments for drawing, and Muller's work on Fortification, &c. A watch was also considered essential "that he may mark the hour exactly when he sent in any report, or what he may have discerned that is of consequence on service."

The details of a young officer's constant expense in those days was reckoned as follows:—

		£	s.	d.
per day	Breakfast	0	0	6
	Dinner	0	1	0
	Supper	0	0	6
	Wine and Beer	0	0	6

Washing per week: 4 shirts, 4 stocks, 4 handkerchiefs, 4 pairs stockings and 2 night caps. £0 1 9.

	£	s.	d.
Hair powder, pomatum, soap, Black-ball, pens, ink, wax and wafers (per week)	0	1	2
Soldier to dress hair, shave, &c. (per week)	0	1	0

In barracks there was an additional expense for washing of bed curtains, sheets, pillow cases, and towels. The young officer's pay was about £73 a year, so that after providing the necessary amount for the above, he had about £17 left over on which to exist. A contemplation of this financial state of affairs calls forth the following remarks of Syme, the editor of the "Young Officer's Military Guide," published about 1780. "You see how necessary it is for the young "officer to be an economist, and what a small balance he has to "support the character of an officer. Should not common humanity "prompt Parliament to support these gentlemen who have had so "great a share in adding to the vast extent of territory to this king-"dom, so much glory to its annals, and wealth to its individuals. "What greater object of compassion to relieve, or where is gratitude "more due? The present pay of an Ensign was established in 1688 "and at that time it was worth thrice its present value."

In camp each subaltern contributed a day's pay towards the purchase of a dining tent, kitchen tent, as also to enable a Sutler to buy a cart and two horses, table linen, and kitchen furniture, &c. The price to be paid for each guest at dinner in camp was fixed at one shilling. It was also laid down that if he provided himself with

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a marquee, the dimensions must be uniform throughout the Corps, and the ornaments according to the facings of his Corps.

During a campaign all officers received free rations, the number of the latter depending on his rank. In the case of a Subaltern these were equivalent to those of two privates. In the American war the weekly allowance of rations for one person was:—

Seven pounds of bread or flour.
Seven pounds of beef or pork.
Half a pound of rice.
Three pounds of peas, and
Six ounces of butter.

A Subaltern also received £3/15/0 towards providing himself with a Bât-horse to carry his kit on a campaign, and forage. When in winter quarters, in lieu of forage in kind, a money allowance for the whole period was given. This in Flanders amounted to £5/6/3 and was considered insufficient.

A complete ration of forage in kind, when the army was in Germany, consisted of per day:—

Old hay, 14lbs.; oats, 8lbs.; straw, 6lbs. In Flanders, 2 extra pounds of oats were issued in lieu of the same amount of hay.

This was before the days of "Allowance Regulations" and much was left to the discretion of the C.-in-C. in the field.

Thus there was much discontent in Flanders in 1744, as to the insufficiency of the allowance for bât-horses and forage during the period of Marshal Wade's command. The economy practised, we are informed, "proved so hurtful to the officers of infantry that "numbers at the close of the campaign sold out of the army." The Duke of Cumberland was more generous in the matter of horse allowance, and it was laid down that his allowances were to constitute a precedent in this respect in any future wars. A military critic writing at the time says, however, "I think it were to be wished, that "another ration was allowed to each Subaltern of the British Infantry, "who are often sent by themselves at a considerable distance from "the army, to bring to it recovered men from the hospitals, and on "many duties which they are generally obliged to perform on foot,[1] "nobody in a regiment being able to spare a horse during the cam- "paign, the field officers themselves being so stinted in their allow- "ance of rations of forage, that they cannot keep one bât or spare "horse to assist an officer on a march, whose baggage is sometimes "lost by an accident happening to his bât-horse; and when sent upon "any command, they cannot carry provisions or liquor to refresh the "officers with them, according to the customs of the army, and what "is practised by the field officers of other nations, who besides being "allowed to keep a wagon (which the British are not), have about "double the number of rations of forage allowed them, and the other "rank of officers more than double, by which means, when British "Subalterns are mixed with those of other nations on detachment, "they are on foot while every Subaltern of the foreigners is mount- "ed; and what makes it still more remarkable, when an orderly

[1] This was before the introduction of railways.

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" Subaltern of Infantry is demanded by a foreign General, who com-
" mands either a Party or Corps de reserve as customary, if the said
" body or party marches, our Subalterns are obliged to steal off or
" trot before him on foot; this happened in still more disagreeable
" light in Germany, when a Subaltern of Infantry of each nation
" attended the different Provosts, in order to see that a foreign Pro-
" vost should not do injustice to or accuse falsely any man of their
" respective nations, our Subalterns were the only officers on foot
" on such occasions, for which reason Lord Dunmore procured an
" order, that a Subaltern of Cavalry should do that duty for the
" British, and this continued to the end of the War."

From a study of the remarks in this paper, it is obvious that even 150 years ago, the emoluments of the British Subaltern were considered insufficient to ensure that living wage, which everyone now claims.

In those days, however, at any rate in peace, the work of the British officer was estimated at that which we in these days assign to the "part timer." But the British officer of 1910 may, with all due respect, fairly be styled as regards his work, a " whole hogger," and will eventually have to be paid accordingly. Otherwise it is to be feared he will practically cease to exist.

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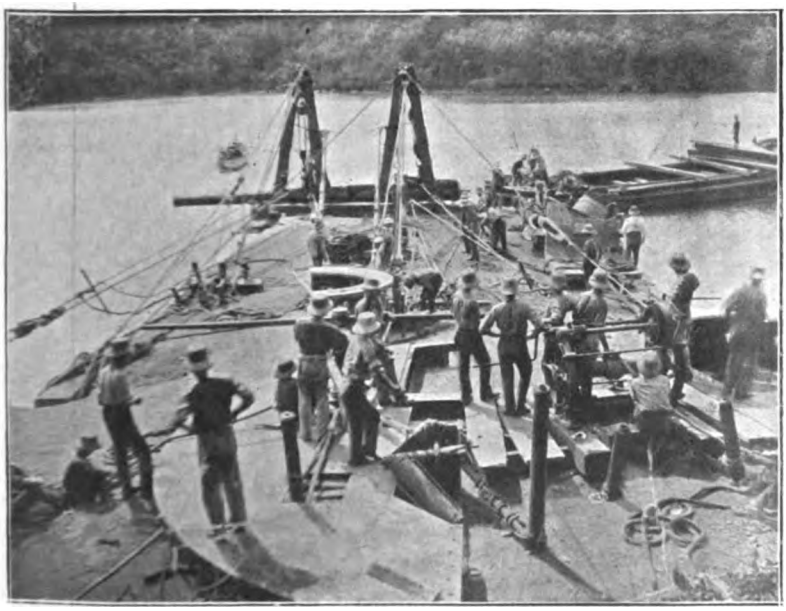
Raising a 9·2-inch Mark X gun out of the sea at Trincomalie.

By COLONEL J. LEWES, R.G.A.

AT the end of June, 1909, while embarking a 9·2 gun and carriage at Trincomalie the barge capsized and the gun and carriage were precipitated into the sea at the end of a small pier on Sober Island.

It was necessary to get them up as quickly as possible, both on account of the possible damage to the bore from salt water, and also because the steamer to bring the guns round to Colombo was shortly to arrive.

The stores available were the ordinary stores for moving these guns and mountings, but there were no sheer spars available.



GENERAL VIEW.

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There were, hoewver, available :—

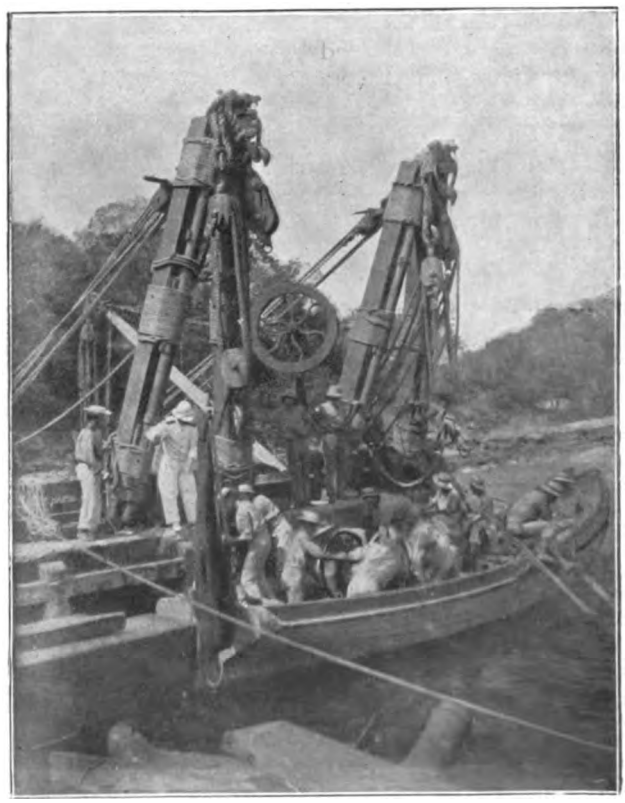
Two 18 foot heavy gyns.
Four 18 inch treble blocks.
Four 15 inch treble blocks,
and sufficient rope and slings, also
Two 25 ton winches, and
One crab capstan.

The cheeks of the heavy gyns were not sufficient to take the weight and so 20′ × 15″ × 15″ skids were lashed to them as shown in plan, the ends of the skids being cut to convenient lengths.

The plan shows the arrangement of the back guys, and as a fore guy was impossible, a prypole was lashed to each pair of sheers to prevent them heeling inwards.

The ground was bad and until the guy, shown as extra Bridle guy was put on and made fast to the ends of the concrete on each side of the pier, the right hand pair of sheers could not take the weight.

A 6-inch tackle on each pair of sheers would have been insuffi-



DIVERS AT WORK.

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cient, so it was necessary to have two tackles on each pair of sheers, and as there were not enough 18-inch blocks, it was necessary to have a 6-inch and 5-inch tackle on each pair of sheers.

The plan and photographs show the arrangement.

A difficulty now arose of keeping the strains on each pair of tackles even.

The running ends of the two falls were knotted together and the loop taken through a snatch block which was connected to another snatch block and a 6-inch rope brought from a holdfast through this and back to the winch.

For stopping and shifting the knot on the main tackles, stoppers were applied close to the sheers, and the strain taken by tackles as shown. The ends of these falls being knotted together as previously described and the end taken back to a crab capstan, which was able to take the weight, and thus relieve the ends of the main tackles which were then shortened and the weight taken again on the winch.

The slings were fixed by divers from H.M.S. " Proserpine."

The first day the back holdfast drew, but after the extra back guy had been put on, the gun came up without a hitch.

Lifting began about 9.45 a.m., and by 5 p.m. the gun was again on the barge.

Every assistance was offered by H.E. the Commander-in-Chief of the East Indian Squadron, who was at Trincomalie with his flag-ship H.M.S. " Hyacinth " and H.M.S. " Proserpine," but with the exception of the slings being fixed by the divers, and the caulking

RAISING THE CARRIAGE.

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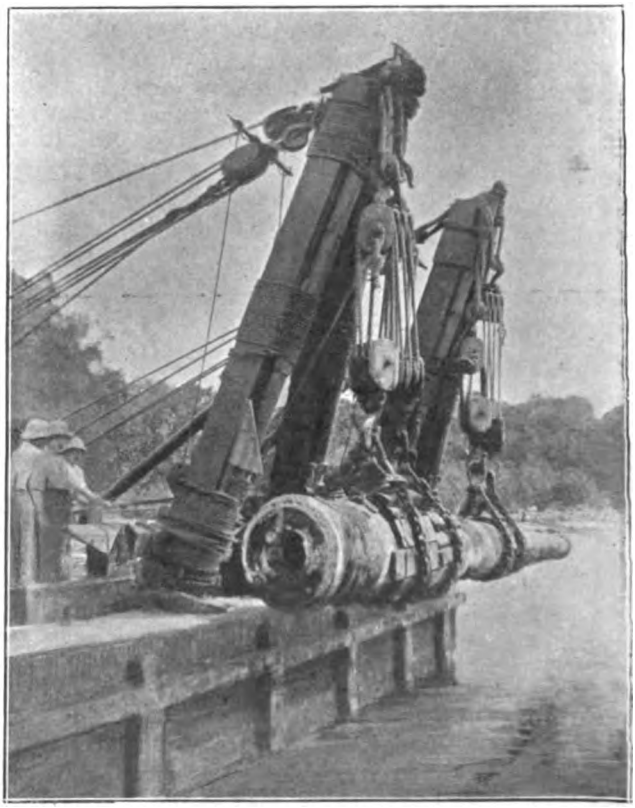
of the barge, which leaked badly when the weight was again put on it, the R.G.A. Detachment were able to do the work themselves.

The arrangement of the sheers and working out of strains, &c., was done by Captain H. C. H. Burton, R.G.A., and he also got the carriage up as shown in the photograph.

The carriage was afterwards got up as shown in the photograph, the sheers had to be lengthened owing to the 18 feet not giving enough lift.

It was only with great difficulty that the barge was got underneath the gun.



GUN CLEAR OF THE WATER.

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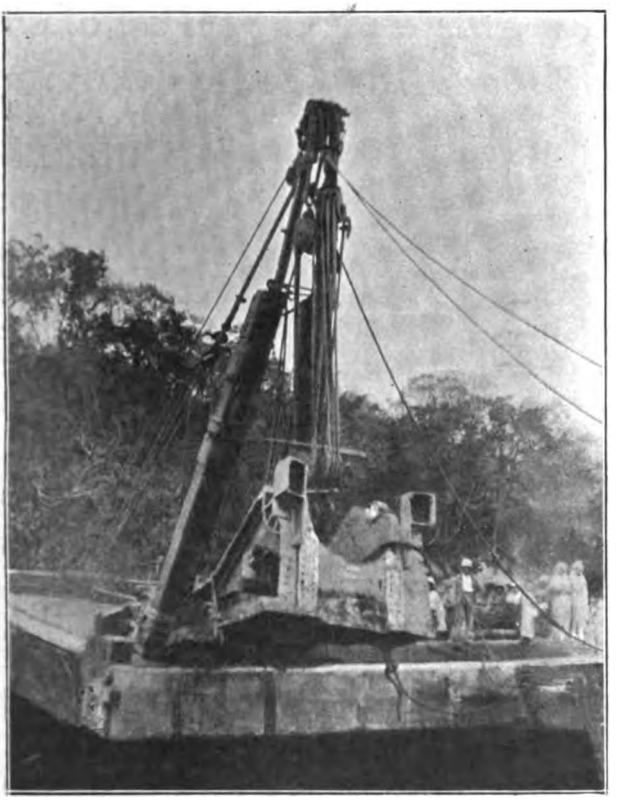

RAISING THE CARRIAGE.

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A Short History of Kane's 'List of Officers of the Royal Regiment of Artillery.'

By MAJOR JOHN H. LESLIE, R.A. (retired list).

THE Committee of the Royal Artillery Institution having decided to publish a new edition of "Kane's List," the following short history of the book may not, at the present moment, be without interest.

John Kane (No. 1039 in the 1900 edition of the List) had held the post of Head Clerk in the office of the Deputy Adjutant General, R.A., since 1789, and had been promoted from the rank of Serjeant to that of 2nd Lieutenant in the Invalid Battalion, R.A., on July 1, 1799.

The List (original edition) was published by him in 1815. It was a foolscap folio book (pp. XII and 99), and was printed at Greenwich.

Kane died at Woolwich in July, 1834, and the surplus stock of the List appears to have passed into the hands of J. M. Boddy, a retired N.C.O. of the R.H.A., who had opened a stationer's and printing establishment in Artillery Place, Woolwich.

In order to get rid of this stock, Boddy, with official sanction, reissued the original edition of the List with additional leaves, completing it up to June 18, 1835. This reissue was actually a second edition of the book.

The next edition appeared in 1869—a demy 4to book of 200 pages. The type was entirely reset, and the List was brought down to July 7, 1869. Following page 200 is an un-numbered page of "Corrections and Additions to December 11, 1869."

The editorial work was undertaken by Lieut.-Colonel F. Miller, V.C., (No. 2210). assisted by Serjeant J. A. Browne,[1] R.H.A. Band. Colonel Miller went to India at the end of 1868, and the work was completed by Browne, the proof sheets being submitted to the D.A. General, R.A., for verification.

"Short Biographies of some of the more distinguished Officers" appear in this edition for the first time. They are for the most part disappointing, and devoid of all sense of proportion. They were continued and added to in the 1891 and 1900 editions, but require careful revision and re-arrangement.

[1] Became Band-master, R.H.A., in January, 1870, and was discharged in 1878, when the R.H.A. Band was absorbed in the R.A. Band. He is still living. Author of "The North West Passage, and the fate of Sir John Franklin," 1860; and of "England's Artillerymen," 1865.

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This edition—1869—contained the names of 207 Officers which ought to have been included in the original List.

The next "Revised" edition, published in 1891, differs but slightly from that of 1869. Brought up to date, it contains 285 pages and 4911 names—an addition of 1604 names since 1869.

After an interval of three years only, we find that another edition is in contemplation. From an article which appeared in Volume XXI. (1894), of the Proceedings, R.A. Institution—page 580—entitled "On the Revision of Kane's List of Officers, Royal "Artillery," the following extract is made:—

"The original Kane's List numbers are to be held as sacred, and "in cases where new names which have been accidentally omitted "from Kane have to be interpolated, they will be given the number "of the name immediately preceding their position on the Seniority "List, and will be distinguished by letters *a*, *b*, *c*, &c. Thus, it will "be quite safe when referring to Officers of the Regiment for purposes of identification (as is done, I think, in our Photograph "Albums in the R.A. Mess, Woolwich), to quote the Kane's List number, which has in fact become the Officer's Regimental number."

The new edition was published in 1900, brought down to the end of September, 1899. It is called the "Fourth" edition, but is really the fifth.

In general design, shape, and size, the book is the same as the two previous editions, and contains pages XIII. and 274.

In this edition appear for the first time the Notes on Officers' Services collected by the late General W. H. Askwith, R.A.

These Notes have been transcribed from his MSS. without any attempt at revision. They are printed on pages parallel to those already existing, so that on one page the names appear as in previous editions, being repeated on the parallel page with the Notes added —all appearing in one opening of the book.

The edition which has now been undertaken will have some new features, the most important being the division of the List into two volumes.

The idea of the Committee which is dealing with the matter is to put as much into Volume I. as may be looked upon as completed history, and it has been decided to take the date of the amalgamation of the Indian Artilleries with the Royal Artillery as the end of Volume I.

The date of the War Office Gazette appointing Officers of the Bengal, Madras, and Bombay Artillery, to the Royal Artillery, was April 20, 1862, and the names of Officers who received commissions in the R.A. prior to that date will be included in Volume I., which will end with the name of James Keith (No. 2906), who received his first commission in December, 1861.

The names of the Officers of the Indian Artillery who were appointed to the R.A. will be given in Volume I., with the dates of their subsequent promotions, &c., as R.A. Officers.

The arrangement of the type will differ from that of the last three editions in that it will be set up as books usually are, thus obviating the very uncomfortable necessity of having to turn the book through an angle of 90 degrees when opening it.

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The numbers, names, dates of commissions, and of promotions, will be given on the left hand page of an opening, and the War and Foreign services, dates of retirement, &c., on the right hand page.

The various Lists of *cadres* which have now ceased to exist—Paymasters, Medical Officers, Veterinary Surgeons, Corps of R.A. Drivers, Field Train Department of the Ordnance, &c.,—which are given at the end of the present edition, will all be included in Volume I.

Thus in Volume I. there will be finality, and in the future *this volume will not be republished.*

It is a book which every "Gunner" should possess, not only for the personal interest which he may feel in it, but for that far greater interest which will attach to it in years to come, when others have taken our places in the Empire's doings—others who, it is hoped, will take pride in possession of the book, if only because it contains the record of ancestors who had the honour of serving their country as Officers in the Royal Regiment of Artillery.

The Royal Artillery has existed as a Regiment for nearly two hundred years. On its roll are the names of men who have made a world-wide reputation, not only as soldiers, but in many other vocations.

"Gunners" have served in every branch and department of the Army outside the artillery; nearly 150 Officers, who commenced their career in the R.A. are now serving in the Indian Army; two Officers —G. Cookson (566) and P. Faddy (1157)—served as Midshipmen in the Royal Navy before they entered the R.A.; and we can claim the Author (Sir Howard Douglas) of a "Treatise on Naval Gunnery" —a book first published in 1819, which ran through five editions, (the fifth published in 1860), and received the extreme honour of being translated into French, and published in France.

"*Ubique*" and "*Quo Fas et Gloria ducunt*" are mottoes which appeal to all ranks, and will do so for all time. The highest known mountain in the world—Everest—is named in honour of a Bengal "Gunner"—an honour which no other Regiment can share.

The names of many great and good men are to be found in this book, and although we cannot all be great, we, at least, have the opportunity of being good. But whether we are great, or good, or both, or neither, we have the satisfaction of reflecting that we passed our service amongst honourable and distinguished companions.

Majora canamus.

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Taken at Woolwich, 19 October, 1904.

H.M. KING EDWARD VII.

COLONEL-IN-CHIEF
OF THE ROYAL REGIMENT OF ARTILLERY
PATRON AND PRESIDENT
R.A. INSTITUTION.
BORN 9 NOVEMBER 1841, DIED 6 MAY, 1910.

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DEATH OF

His Majesty King Edward VII.,

OF THE UNITED KINGDOM OF GREAT BRITAIN & IRELAND, & OF THE BRITISH DOMINIONS BEYOND THE SEAS, EMPEROR OF INDIA, DEFENDER OF THE FAITH.

An extraordinary London Gazette was issued on Saturday, 7th May, 1910, from Whitehall, containing the following announcement:—

"On Friday night, the sixth of May instant, at a quarter to "twelve o'clock, our late Most Gracious Sovereign King Edward "the Seventh expired at Buckingham Palace in the sixty-ninth "year of His age, and the tenth of His Reign. This event has "caused one universal feeling of regret and sorrow to His late "Majesty's faithful and attached subjects, to whom He was "endeared by the deep interest in their welfare which He invari-"ably manifested, as well as by the eminent and impressive "virtues which illustrated and adorned His character."

A Council was held at the Court of St. James's, London, on the 7th May, 1910, at which His Majesty the King was pleased to make the following announcement:—

"My Lords and Gentlemen—

"My heart is too full for Me to address you to-day in more "than a few words. It is my sorrowful duty to announce to you "the death of My dearly loved Father the King. In this irrepar-"able loss which has so suddenly fallen upon Me and upon the "whole Empire, I am comforted by the feeling that I have the "sympathy of My future subjects, who will mourn with Me for "their beloved Sovereign, whose own happiness was found in "sharing and promoting theirs. I have not only lost a Father's "love, but the affectionate and intimate relations of a dear friend "and adviser. No less confident am I in the universal loving "sympathy which is assured to My dearest Mother in her over-"whelming grief.

"Standing here a little more than nine years ago, Our "beloved King declared that as long as there was breath in His "body He would work for the good and amelioration of His

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" People, I am sure that the opinion of the whole Nation will " be that this declaration has been fully carried out.

"To endeavour to follow in His footsteps, and at the same " time to uphold the constitutional government of these Realms, " will be the earnest object of My life. I am deeply sensible of " the very heavy responsiblities which have fallen upon me. I " know that I can rely upon Parliament and upon the People of " these Islands and of My Dominions beyond the Seas for their " help in the discharge of these arduous duties, and for their " prayers that God will grant me strength and guidance. I am " encouraged by the knowledge that I have in My dear wife " one who will be a constant helpmate in every endeavour for our " people's good."

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The necessity for Officers of all branches studying the problems involved in the defence of Coast Fortresses.

By COLONEL W. R. W. JAMES, R.G.A.

It is evident that to establish my assertion, I must show:—

(1). That coast fortresses are necessary.

(2). That there is a likelihood of their being attacked.

(3). That the attack may be carried out in such a manner that the brunt of the fight will fall on that part of the garrison not employed in manning the fixed armaments.

Are coast fortresses necessary?

Before attempting to answer this question, the term must be defined.

"Garrison Artillery Training," defines a coast fortress as an area of land and sea provided at certain points, or along tactically selected lines, with works of defence, and with an artillery armament partly fixed and partly movable.

Field Service Regulations however, now employs very nearly the same definition for Coast Defences, and the Army List shows the Commands as Coast Defences.

Many of these comprise several harbours far apart, each of which is a distinct coast fortress, Harwich and Chatham for instance, are both in the Eastern Coast Defence Command.

The defence of such areas must comprise a large, entirely mobile, field force; and in no way concerns the garrison gunner in his specialist capacity.

I should define a coast fortress as the area commanded by the guns of the fixed defences with the addition of the positions which must be held for their immediate security.

The fortress as I have defined it, may act as a pivot of manœuvre for the field army, but, if its safety is not to be unnecessarily jeopardised, its garrison must be kept entirely distinct, and not drawn away on any pretext.

There are many varieties of Ports. At home we have:—

(1). The great Naval Dockyards, Portsmouth, Plymouth, and Chatham.

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(2). Mercantile ports, Liverpool and Cardiff.

(3). Harbours of refuge, Falmouth and Scilly Isles.

(4). Ports that are the centres of more than one interest, e.g. the Tyne, which is the seat of gun making and ship building industries; though privately owned, the protection of the establishments there would be a vital necessity in war time, and

Cork, which besides being a harbour of refuge and a mercantile port, has a small naval establishment.

Abroad we have:—

(1). Coaling stations, generally combined with repair establishments; *e. g.*, Hong Kong.

(2). Commercial ports, *e. g.*, Colombo.

I propose however, to omit all reference to purely mercantile ports, which belong to a separate and very much disputed question, viz.—The protection of commerce; and group the remainder under two heads viz.:—

(1). Main base ports.

(2). Advanced bases or depôts.

There is no doubt that a large section of the public press ridicules the idea of the necessity of coast fortresses. Here is an extract from *Truth*, dated October 20th 1909:—

"The Garrison Artillery, being practically a non-combatant Corps, remains the same discredited service it always was . . . . there is no further rôle for the typical Garrison Gunner, rubicund of face, rotund of figure, wide of waist, seated on a stool in a Position Finding cell, watching the tide come in and go out, and waiting for ships which never pass by."

" Fixed fortifications have been superseded by floating defences; forts by ships."

It is a mistake to disregard these utterances. In a democratic country, the press almost entirely guides popular opinion.

The average man in the street, the voter, adopts his ideas ready made from the morning papers; and as ultimate political power rests with him, those ideas eventually control the policy of the Nation.

It is not however, only the pen of the irresponsible newspaper scribbler which is directed against the maintenance of fixed defences.

There are men, on whose opinions those responsible for National safety have a right to rely, who have ventilated the same ideas.

To make good my contention, their arguments must not only be seriously considered, but confuted by reasoning which will bear critical examination, and is supported by the experience acquired in past wars.

The difficulty of such an attempt for a landsman is very great, embracing as it does, the consideration of such a technical matter as Naval warfare.

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It must be recognised once for all, that the only justification for fixed defences at Naval bases is their utility to the Navy.

The Art of Naval warfare:—

Fortunately for my purpose, Admiral Sir Cyprian Bridge, as lately as 1907, published a small volume written in non-technical language, principally with the object of educating the lay reader.

As he voiced the extreme anti fortification theories, if satisfactory confutation of his arguments can be deduced from history itself the necessity for fixed armaments may be accepted.

Sir Cyprian claims in his preface that his theories are the "succinct summary of the results of study extending over a period, "the length of which will be understood when it is known that the "views of the author began to be published in the *Edinburgh Review*, in 1872."

It will thus be seen that I have not fastened on any hasty expressions of opinion, to twist them to my own purposes.

Sir Cyprian Bridge states:—

"The aim of Naval warfare is to obtain command of the sea, an "expression which means control of maritime communications—that "is to say, of the ocean paths which connect one part of an extensive "empire with another, which sea-borne commerce must traverse, and "along which belligerent expeditions must proceed."

"The Power that obtains this control, can attack its enemy "where it pleases, and evidently the control must be obtained before "a great military expedition can be sent across the sea."

He then proceeds to lay down the best methods of obtaining this command of the sea, which may be briefly summed up as concentration of your forces, and seeking out and attacking the enemy.

"The enemy's fleet remains the objective until its destruction or the end of the war."

No one will be inclined to dispute this axiom.

To carry out this duty however, the fleet must be absolutely free to seek out the enemy wherever he may be. It cannot do this if it is in any way tied to its own shores.

During the Spanish-American war, although the American Fleet was in every way superior, yet for a very considerable period it was tied down to the coast line on account of the popular panic that arose owing to the defenceless state of the American Ports; nor is this the only instance.

Sir Cyprian remarks—"Command of the sea has been obtained "by intimidating an enemy's naval force into inactivity, as occurred "in the War of American Independence, when a British Fleet was "kept in home waters by the Government instead of being sent to "prevent a French force from crossing the Atlantic."

Is it not courting a repetition of the occurrence, not to fortify your bases sufficiently to leave the Government under no misapprehension as to their safety?

Mahon says, in the influence of sea power on the French Revolu-

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tion, " that the navy is the first line of defence, both in order and " importance, by no means implies that there is or should be no " other."

" This forced and extravagant interpretation (for which naval " officers have been largely responsible), of the true opinion that a " navy is the best protection for a sea frontier, has very much to do " with that faulty strategy which would tie the fleet, whatever its " power, to the home ports, and disseminate it among them."

" Navies do not dispense with fortifications nor with armies; but " when wisely handled, they may save their country the strain which " comes when these have to be called into play."

Now Mahon is not generally considered as a writer who underrates the powers of the navy.

The more vigorously the offensive is pushed, the further from the base will be the efficient fighting units, consequently they will have less direct effect in affording it protection from petty attacks.

In making this assertion, so repugnant to the extreme Blue water school, one must be careful in weighing the arguments and sifting the facts produced in support of it.

It must be admitted that during the periods that our maritime ascendancy has enabled us to take the offensive, no naval base has been so attacked; a serious objection if it can be shown that at such periods any naval base has been left without fixed armament.

I cannot discover, however, that this was ever the case.

When the Dutch sailed up the Medway, the defences at the mouth of that river were utterly inadequate, and we suffered accordingly.

Luckily, Upnor Castle barred the way to Chatham.

The haste with which, after this event, the Government erected formidable fortifications at Garrison Point shows that practical experience taught them the value of fixed defences. Nor is the example quite beside the mark, for the difference in the defencelessness of the base in the two cases is not very great, provided the raiders are working on a well considered scheme capable of being carried out in a short period. That foreigners, who lay themselves out to obtain it, can acquire accurate information, on which not only to base their plans, but to carry them through in the most expeditious manner, is a fact that years of residence in coast fortresses brings home to one with a most disagreeable insistence.

The principal defence, however, of naval bases in the old sailing days, was their inaccessibility.

Ports which were easily entered, and, therefore, exposed to raiding attacks, declined in importance at a very early date.

It is hard for the modern landsman to realise the difficulty that was experienced in getting ships in or out of harbour before the era of steam began. Our fleet could not move from Spithead to St. Helens—the outer anchorage, against a foul wind on account of the inability of line of battle ships to beat to windward in narrow waters. More than once this led to serious consequences. The French fleet could not leave Brest without a fair wind.

The only method of taking vessels up the Hamoaze to Devonport,

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or Plymouth Dock as it was then called, unless the wind was fair, was by kedging, an inconceivably tedious and exhausting process, and the wind on an average eight days out of ten does blow down the entrance.

Anyone who had the opportunity of watching one of the old training brigs at Plymouth or Portsmouth, and seeing it trying to beat out of the port, got just a glimmering of the difficulties of a square rigged ship trying to turn to windward in narrow waters, but the difference in handiness between small craft and a line of battle ship, especially a three decker, were simply enormous. In fact the old three decker was about as weatherly as Noah's Ark.

Apart from these difficulties, small craft in those days could not work the damage they can now, thanks to torpedoes and high explosives.

The inducement to attack was not so great, for then naval stores were not so specialised as now, and their destruction would not have been so great a gain.

Naval lines of communication and bases, even of a nation with maritime preponderance, are far more vulnerable than those of an army.

An enemy contemplating an attack on either is independent of roads, neither is he hampered by consideration of supplies, his ships for the period required being absolutely self-contained.

Though wireless telegraphy affects the problem in planning the raid on a naval base, it would be a bold man who would assert it made it an impossibility. A short time ago we were assured that by adopting a system of tuning, our messages could be sent without interference or even detection, but already the genius of the inventor has tackled this problem. An instrument has now been produced capable of detecting different lengths of waves, so that messages can be annulled or confused, or even false messages transmitted.

But surely in any case it would be playing the enemy's game to recall any of our fleet acting on the offensive to deal with a diversion such as an attack on our base.

Even Sir Cyprian does not advocate an entire abandonment of land defences, but wishes to entrust it to a mobile force.

Unfortunately, Sir Cyprian does not condescend to differentiate in his book between the fortification of naval bases and coast defence generally, or local defence as he prefers to call it.

He argues, no doubt rightly, against spending money on small craft for local defences; remarking that, as the greater contains the less, a superior sea going fleet will prevent an enemy making isolated descents on a coast.

Again, he insists on the fact that the proper use for the destroyers, &c., is the offensive.

"What is called the "torpedo boat menace," will be less formid-
" able in local defences than it would be in inspiring the enemy with
" fears for the safety of his ships in or near his own waters."

" A local defence arrangement, even if successful in one place,
" will not put an end to the power of assailing an opponent's territory,

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" possessed by a belligerent, whose sea going force is still formidable. " War between great civilised nations is not made up of a series of " pin pricks. A savage may tomahawk many a sentry, or ravage " many a maize patch whilst the owners are sleeping; but except he " fights an antagonist as low in the scale of culture as himself, his acts " will have little effect on the course of the war. Similarly isolated " descents upon a coast may be annoying, and the cause of alarm " amongst non-combatants; but beyond exasperating the side assailed, " they will have no great effect on hostilities between nations pos- " sessed of navies and meaning to fight on the high seas. Coast " defence in its true meaning is the strategic method of counteracting " an enemy's intention of proceeding across the sea to attack territory " in serious form."

Again,

" Effectual protection against minor attacks on territory, some- " times called raids, demands not localised defence by special craft, " but correct strategical distribution and organisation of an adequate " sea going force in addition to moderate land defences which may " be localised."

He however advocates mobile bodies of men with guns in preference to fixed works.

Fixed or passive defence against apprehended naval attack has " in practice always led to the adoption of a long series of protecting " arrangements, to enumerate which would be to parallel the jingle " of the house that Jack built. The battery defends the anchorage; " infantry defends the battery; underwater mines defend the channel; " electric lights and quick firing guns defend the mines; a movable " force defends the lights and Q.F. guns. The sea going naval force, " which is sometimes unnoticed, defends the whole."

This, although not specifically stated, is a distinct attack on the policy of fortifying naval bases. This obvious sneer at first sight appears to carry some weight, but on analysis, it does not in reality reveal any profound criticism.

In all operations, offensive or defensive, by land or sea, mutual support is the most essential factor of success.

If the paragraph has any serious meaning; it is a statement that obstacles are useless unless they are under observation and effective fire; that entrenchments can be turned, and turning movements must be met by fresh dispositions; and that the ability of a force, by acting offensively, to protect its base from the enemy's main body, does not receive proper recognition.

None of these self-evident facts have been disputed by strategists, yet we do not find the employment of obstacles or entrenchments abandoned, nor local arrangements for the security of bases disregarded.

I think any unprejudiced person will allow that even a partially successful descent on a naval base would be anything but a pin prick.

Deprive Portsmouth, Plymouth or Chatham, of its fixed arma-

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ment, and what is to prevent the comparatively weak squadron, which Sir Cyprian admits cannot be prevented from reaching our coast, from working sufficient havoc to materially damage our position.

The plant needed for the repair of modern ships is of so specialised a nature, that it would not be easy to improvise. Our great naval magazines, Upnor, Bull Point, Priddy's Hard, would all fall an easy prey to such an attack.

A further point to be considered when talking of a mobile land defence, is the speed of modern ships compared with that of land forces. The term mobile is hardly applicable when we consider the proportional speed between the two, 5 or 6 to 1 in favour of the ships.

Yet again, if anyone will take a big scale map of any of the places I have mentioned, he will easily recognise the further handicap under which the land forces will suffer. All these estuaries abound in ramifications which make the rapid movement of troops from one part to the other impossible, except by water transport, and how could water transport be carried out in the face of the enemy's local superiority on the water.

The technical question of fixed versus mobile armament is one on which the garrison gunner feels entitled to speak. In the present state of artillery science, no mobile gun could be made powerful enough to demand serious notice from an armoured ship at any range.

As regards anti-torpedo boat defence, the attacks of hostile small craft are delivered so swiftly and suddenly that it would be quite impossible to gain any value from mobility. As night attacks are the principal danger, the effectiveness of the anti-torpedo boat armament depends on the relative position of the electric lights and guns; and, if fighting lights are used, on their speedy manipulation in accordance with the wishes of those in command of the guns. These conditions absolutely dictate elaborate and expensive preparations in advance; and are quite incompatible with change of position.

All classes of fixed armament are gun for gun so superior in quickness and accuracy of fire, owing to the better arrangements that can be made for ammunition supply, accurate range finding, and better fire control and direction, that no one who has any practical acquaintance with the subject, can conceive the idea of substituting mobile for fixed defences. At most defended harbours there is no difficulty in selecting positions from which the approaches can be effectively commanded without an undue multiplication of guns.

It was entirely owing to the efficacy of fixed armaments that the French were able to keep up their coasting trade in the Mediterranean, and thus supply their army in Italy. Nelson found that he would need a much more powerful squadron than he had at his disposal to cut out the coasters sheltering under the numerous shore batteries that Bonaparte had erected.

To arrive at a proper appreciation of what defences are required for a naval base, some examination of the strategical situation that might arise in the event of a naval war is necessary.

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It is generally accepted that the true method of establishing naval ascendancy is to seek out and destroy the enemy's fleet.

If both sides feel strong enough to adopt the offensive, a naval battle will ensue. If one side or the other gain a decisive victory, the remains of the defeated fleet will retire to a defended base, and the victorious one attempt to establish what is generally spoken of as a blockade. In most cases, however, it is really the assumption of a position, such that the enemy is unable to leave the port without being brought into action.

This at all times has been a most harassing duty, and history is full of the difficulties of the commanders of fleets in keeping their ships efficient under the circumstances. Reliefs were necessary, as units had to return at intervals to refit. The hardships endured by our sailors in old times were great, but I venture to think that in future wars they will be even greater.

A comparison here between the methods employed in the blockade of Brest in the Napoleonic War, and that of Port Arthur by the Japanese, will explain my meaning.

" The disposition of the ships when before the Port, with a view " to prevent the evasion which was the height of French naval ambi- " tion, and to compel the enemy to battle if he came out . . . ." may be given nearly in his (St. Vincent's) own words.

"A squadron of five ships of the line is always anchored during " an Easterly wind between the Black Rocks and Porquette shoal " (about ten miles from the entrance)."

" Inside, between them and the Goulet, cruize a squadron of " frigates and cutters, plying day and night in the opening of the " Goulet; and outside, between the Black Rocks and Ushant, three " sail of the line cruize to support the five anchored."

Signalling was maintained daily between at least the outer members and the main body.

St. Vincent remarks " I never was on a station so readily, and " with so little risk maintained as that off Ushant with an Easterly " wind " (Mahon here interpolates "with which alone the enemy could " get out"), "owing to length and strength of flood tide."

" If the tide flows strong, you will find much shelter between " Ushant and the Black Rocks during the day."

It will be understood from these quotations, that the elements were the chief dangers to the blockaders.

To turn to Port Arthur.

Instead of part of the battleships being at anchor within ten miles of the blockaded Port, we find them nightly 100 miles from Port Arthur, and even then all on the qui vive for the attack of a destroyer—the inshore observation maintained by destroyers, backed by cruisers at a more respectful distance; their daily and nightly routine, embracing continual small engagements, with mining, sweeping, and other arduous duties.

The daily risk from mines are great, and the necessity of obtaining information of what the Russians were doing, constantly exposed

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these small craft to the fire of the shore batteries, and yet the Russians were more inactive and less aggressive than we have any right to assume another adversary would be.

In the old days a capital ship under way, had little to fear from any but her own class, whereas now, the mine, the destroyer, the submarine, all represent dangers demanding a constant watchfulness most trying to the nervous system; and quite apart from any material damage, ships' companies must obtain an occasional respite if they are to remain efficient.

For this purpose they must have a base which will ensure them both rest and security.

The Japanese were fully alive to this necessity, although only opposed to an inactive enemy. Every attempt was made to improvise defences for their bases in the Elliot Islands, booms were constructed, mines laid, and guns mounted to defend the approaches, but no one knew better than the Japanese themselves how inadequate they were, and it was only the inability of the Russians to make use of the means they had, which prevented the Japanese suffering from this weakness.

The Russians excused their want of enterprise by stating that their destroyers could not attack and get back under cover of darkness; but, if they had arranged to cover the ultimate withdrawal of their destroyers with a proper force of cruisers, the former could have secured sufficient time to harass their enemy's base.

It is, however, an absolute necessity for those directing naval affairs, to consider what course events would pursue supposing a reverse should compel a temporary abandonment of the aggressive policy.

As has been explained, before the commencement of hostilities our naval force would probably be concentrated in positions of strategic value, probably open roadsteads, for a fleet takes a considerable time to get in and out of a harbour, and without suggesting that our people might be caught napping like the Russians were at Port Arthur, it is possible, taking into consideration modern engines of destruction, that it might be necessary to withdraw several units to a base port for repairs.

An active enemy would at once proceed to follow up his success.

Supposing the Port is not fortified, imagine the confusion that would ensue. Ships in dry dock for repairs are helpless; and taking into consideration the confined space of most of our base ports, no ship, even afloat, would be able to protect itself very efficiently. Thus we see the necessity of anti-torpedo boat armament.

Doubtless the mouth of the harbour would be protected by a boom, but an obstacle on the sea, similar to one on shore, is of little use unless under an efficient fire.

Now the principal weapon against the boom is the boom smasher, a vessel of sufficient weight and size to develop a momentum, against which no chain or wire hawsers will stand. This must be met by the fire from guns sufficiently powerful to sink her before she can close.

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This is not so easy as may be thought. A merchantman, if her vitals are protected by coal, can stand an astounding amount of hammering by 6-inch guns. There were plenty of instances of this in the Russo-Japanese War; but lest anyone should throw doubts on the skill of the Russian gunner, I have one instance to give you that happened in an English port in peace time.

A coal hulk anchored in the Medway a few years ago caught fire, and as the tide was running down, it was feared she would break adrift and foul the ships lying at Sheerness. A gun-boat was sent up to sink her, and fired several rounds of 6-inch into her at a range of 50 yards without much appreciable effect. Eventually her cable parted, and she had to be torpedoed to put her out of action.

From this it can be seen that anti-boom-smashers must not only be effective guns, but also command the approaches, so as to keep the hostile ship under fire for a considerable period.

Unfortunately, you cannot mount guns to accomplish this without exposing them to fire from the sea; and to keep big ships, capable of developing a crushing fire, at a respectful distance, primary armament is required. It is possible to effect considerable damage to dock-yard buildings and ships in harbour, provided effective observation on results can be maintained. It is not neecssary for the observers to be on the ships actually firing, provided the results can be signalled to them.

The Japanese attempt to bombard Port Arthur from the sea was carried out in this manner. Steaming in line, the ships fired in succession over the Tiger's Tail on a fixed bearing. A cruiser lay off the entrance, where she obtained a partial view of the docks and the town, and could signal to the battleships. After a time she was driven off by the shore batteries, and the fire ceased to have any effect whatever.

To drive away ships used for observation, guns of large calibre are required, not only on account of their superior range, but also because the damage they are capable of inflicting with a single round will make an enemy hesitate before incurring the risk.

The conclusions I draw from the above arguments are, that the establishment of fixed armaments at naval bases are necessary to afford security to ships and stores, and rest to personnel; that the mere installation of fixed defences, will deny the approaches of a port to casual hostile vessels, and that the nature of the armament will dictate the minimum strength of a hostile force attempting to harass it.

We must briefly consider our advanced bases in other parts of the world.

This is a very vexed question, over which the very fiercest controversies have raged, and the last few years have seen the dismantling or partial disarmament of many coast fortresses that were previously considered of vital importance.

The arguments against the retention of these advanced bases are briefly as follows:—

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It is inadvisable to withdraw a ship if possible from the sphere of action for even a short time.

" The time at which a ship may need docking, or large repairs " necessitating a visit to a base port, cannot be calculated in advance " even approximately; whereas we can calculate within moderate " limits of error, the time at which she will have to replenish her " stores. We shall, therefore, have to arrange for supplying her " with stores quite independently of the arrangements for her possible, " but not certain, need of repair. We shall also have to arrange the "former, independently of the need of her officers and men for refresh- " ment or relaxation; because this may be satisfied by the relief of a "portion of her crew at a time. In most cases, the necessity of going "into dry dock, or of being extensively repaired, will occur only at long "intervals; and, if it can be rendered unnecessary for ships to visit "bases for other reasons, the service on which they are employed will "be greatly benefited." A well organised system of conveying to ships "everything they require "might render us independent of fixed bases "which have no dry docks or large scale repairing yards."

Against the use of bases Sir Cyprian argues, " It will often be " impossible to determine beforehand the spot at which it will be " strategically most advantageous for us to operate in war. It will " in many cases be decided by the enemy rather than ourselves."

He then argues—supply from bases merely means an interruption of our line of supply—that bases must themselves be filled up from home, and that, therefore, in any case you must keep open the whole line of communication.

He concludes by saying.— " If our plans are so bad, or our " strength so small, that we cannot keep away the comparatively " inconsiderable hostile force which would be all that was necessary " to intercept our store carriers, still less could we stop the larger " force which might find it worth while to make an attempt on the " base itself. The fixed base method of supplying men-of-war in " distant seas, seems to be the outcome of a long period of maritime " peace."

Some of the arguments advanced seem open to dispute. Though coal, which generally forms the sole cargo of a vessel, may be excluded, the economical storing of most warlike stores, supplied in anticipation of wants from a distant base, precludes their being got at with the same celerity as they would be in an advanced base itself, or if reshipped from there in compliance with a direct order.

Generally speaking, some sort of sorting ground is an absolute necessity in dealing with stores in bulk.

Coaling at sea has made great strides, and in fine weather presents no difficulties as far as large ships are concerned, but in bad weather the case is different. Damage to colliers from this cause was commented on by our Naval Attachés during the Russo-Japanese War. Destroyers and such small craft are so susceptible to injury from contact with other vessels, that they at least must seek shelter.

The argument that the whole line of communication to the

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home base ports must be kept open in any case, appears a trifle disingenuous.

If stores are despatched from home in bulk, an occasional convoy is all that is required, and the operations of the fleet itself, acting at a comparatively short distance from its advanced base, will make this lesser length of communication a much easier matter to secure.

The following quotation from "Military Operations and Maritime Preponderance," referring as it does to a time when our maritime ascendancy was never more assured, is well worth consideration as a practical lesson on the difficulty of securing lines of communication.

"Even before the outbreak of hostilities with America in 1812, "the British fleets by no means enjoyed unquestioned control of the "ocean. For although it was possible to ensure the safe conduct of "expeditionary forces over sea, and although no hostile squadron "dared to put to sea from the French naval ports, isolated hostile "ships were busy striking at our trade. And when trouble arose "across the Atlantic, that security enjoyed by transports and by "merchant ships when the command of the sea is absolute and complete, was no longer enjoyed under the Union Jack, even in the "Bay of Biscay and on the coast of Portugal."

"Soon after the battle of Vittoria, five storeships and a troop "transport were captured by the enemy. Reinforcements ready at "Gibraltar and Lisbon could not be despatched to Santander for "fear of hostile cruisers. "I wish you to be distinctly apprised" "wrote Melville from the Admiralty to Wellington in Spain, "that "we will not be responsible for ships sailing singly or without convoy between this country and Spain and Portugal, or for any considerable distance along the coast of these countries."

Surely this is a strong argument for advanced depôts and short lines of communication. The argument as to the security of the base itself falls to the ground, provided it is properly fortified.

As regards the relief of part of the crew at a time, Sir Cyprian does not make it clear where he proposes these officers and men should seek refreshment and relaxation. It must be presumed, however, that as there is no advanced base, they must be sent to a home base port, with the chance of capture in a transport both going and returning. You cannot land them on the enemy's coast, or even on neutral territory. One cannot help wondering too, where these extra men are to be found.

It is entirely a question for sailors to say if they consider such a course would be beneficial to discipline. Having, unfortunately, to endure a similar system in the R.G.A., I can affirm without hesitation, that it is a very bad one in our case. The sudden arrival of fresh contingents has a most upsetting influence; and these changes would have to be frequently made, if the men are not to suffer deterioration from strain. I think both Russian and Japanese experience in the late war, fully bear out this contention.

I confess I was rather astonished at the remark that the fixed base method was the outcome of peace experience.

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During our eighteenth century naval wars in the Mediterranean, one reads a good deal about the necessity of acquiring a base.

When Toulon was evacuated in 1793, Hood chose Corsica as a base, and the ports in that island were forcibly acquired by combined operations. Subsequently, great importance was attached to Minorca as a base, on account of its strategical situation. Trincomalee was taken and re-taken during the contest for supremacy in Eastern waters.

Instances could be multiplied, but it is better to prove a case by calling a few credible witnesses than a host of doubtful ones, and no one has yet denied that Hood or Suffren were great sailors.

Nelson himself was so insistent on the capture of Bastia that he started besieging the place on his own account.

Modern history affords no teaching to the contrary, but rather affirms the experiences of the past. The Japanese, throughout their struggle for Port Arthur, found it necessary, as the fight went on, to establish fresh bases nearer and nearer Port Arthur.

Nor is the reason hard to find. Life on board small craft, especially in bad weather, is so exhausting, that frequent intervals of rest are absolutely necessary. The trying nature of duty in such vessels is acknowledged even in peace time by our own Admiralty, by the grant of hard lying money.

To put a finishing touch to my contention as to the necessity of advanced bases, I will throw into the scales against Sir Cyprian's dictum, two quotations from Mahon. The first is found in "The Influence of Sea Power upon the French Revolution and Empire," and runs as follows:—

"It is essential to a fleet, as to an army, to have always near at "hand depôts of supplies, upon which it can depend to replace the "consumption of the limited stores carried on board, and to which it "can resort to refit. The way from the depôts to the fleet, or the "army, technically called the communications, should be such as can "most easily be defended by the armed force itself, without im-"paring its liberty in movements necessary to obtain the object "of the war."

"In other words, this depôt or base, should be near the scene of "operations, and, when practicable, so situated that the fleet, while "actively engaged, interposes directly or indirectly between it and "the enemy."

One cannot but be glad that Mahon admits the parallel between supplies for a fleet and an army. It enables the soldier to feel confidence that he can apply his own experience to the situation.

In another work—"The influence of Sea Power upon history"—he again insists on the absolute need of secondary bases, and adds:—

"The communications will doubtless be strengthened by the "military holding good harbours, properly spaced yet not too numer-"ous, along the route, as for instance, the Cape of Good Hope and "Mauritius. Stations of this kind have always been necessary, but

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" are doubly so now, as fuel needs renewing more frequently than did " the provisions and supplies in former days."

Is there any doubt as to which writer's words are the more weighty?

If it be conceded that advanced depôts are a necessity, the question of providing defences must be considered.

I think two well known instances of the result of defenceless depôts, and a quotation from Mahon will be sufficient to answer this.

In 1782, Trincomalee was captured by the British just a month before Suffren appeared off Madras. . . . . It made almost an ideal base, but there was no time to place it in a state of defence. In the campaign which followed "Trincomalee unfortified was simply " a centre round which Hughes had to revolve like a tethered animal, " and the same will always happen under the like conditions."[1] The last sentence is a direct quotation from Mahon.

In 1798, Keith found himself in the same position with regard to Minorca, and complains—" It is very hard that I am so shackled " with this defenceless island."[2]

Mahon criticises his strategy, but sums up the situation as follows:—

" Properly, every seaport should be able to hold out for a length " of time, longer or shorter according to its importance, entirely inde- " pendent of the fleet. The latter will then be able to exert its great faculty, its mobility, unfettered by considerations of what is happen- " ing at the port."

" For so long the latter is safe; meanwhile the fleet may be " absent. The best coast defence is a navy; not because fortifica- " tions are not absolutely necessary, but because beating the enemy " is the best of all defences."

Assuming that the necessity of fortifying bases has been proved, the question of the probability of their being attacked must now be considered.

That probability turns on the answers to the following questions:—

1. What force can an enemy hope to divert for this purpose whilst our fleet remains unbeaten?
2. Would such a force have a reasonable prospect of success?
3. Are the chances of success worth the risk, including that of the total loss of the expeditionary force?

As regards the first question.—It has been officially accepted again and again by responsible ministers, that a raid on our shore is possible, but no one as far as I know, has attempted to formulate particulars regarding its composition. The size of the expedition is of course limited to the amount of shipping that can be collected without warning and quickly. Qualities indispensable to success would be few units, great speed, sufficient power to deal with any interference from detachments of cruisers, or the local naval defences disparaged by Sir Cyprian, but which at present exist.

[1] "Military Operations and Maritime Preponderance." Caldwell, page 86.
[2] "Influence of Sea Power upon History," page 430.

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In other words, large and fast transports, armoured cruisers, scouts and destroyers.

We may assume that ships capable of taking their place in the line of battle, would be more suitably employed with the main fleet.

Critics may describe the possible results of the action of such a force as a mere pin prick; but without admitting the justice of such a comparison, it is allowable to point out that a pin prick scientifically directed by a skilful surgeon may paralyse the whole body.

If we credit our enemy with the power of making a raid, ought we not also to admit the probability of his using it to the best advantage, and credit him with intelligence enough to direct it against the most vulnerable spot.

As regards the method of attack that would be adopted, it is generally believed that ships under no circumstances will engage fixed armaments.

I think, however, the following qualifications ought to be accepted, viz., unless there is a fair chance of attaining success, and the objective to be obtained is worth the risk incurred.

People are inclined to accept the degree of vulnerability of ships as an unchanging factor, but in reality, it is one that is continually varying. Just at present, armoured ships, relatively to the power of the armament of British coast fortresses, are better protected now than they have been for the last thirty years.

The only side armour of ships of the Orlando type (our first armoured cruisers) was a narrow belt, and that, when the ships were put in commission, was entirely immersed. Protection for gun crews depended on somewhat inadequate shields.

A comparison with the Scharnhorst is instructive. Note her main belt, extending from end to end, her lower deck belt, lower and upper battery, barbettes and turret hoods, armoured hoists, &c.

On the other hand, no attempt has been made by us to meet this advance in protection by a corresponding increase in power of attack; with this exception—at the present moment certain improvements in projectiles are being tested by the Experimental Department.

On the contrary, there has been in almost every case a wholesale reduction in the numbers of ordnance properly equipped and provided with personnel.

Not only is this the case with regard to primary armament, but the anti-torpedo defence has been weakened in an equal degree.

Coast fortresses have been further weakened by the abandonment of the sub-mining defence, with its highly organised system of observation mines, which contrasted so favourably with the haphazard methol of sowing broadcast contact mines, adopted in the Russo-Japanese War, to the danger of both sides impartially.

The dismantling of the Brennen must also not pass unnoticed.

We have, it is true, acquired the submarine in exchange, but this weapon has its limitations—limitations soon reached in muddy or shallow waters, or amongst intricate channels.

A careful study of the effect of gunfire on ships during the Russo-

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Japanese War, reveals the fact that armoured ships are not so vulnerable as was generally supposed.

Special correspondents, with their highly coloured descriptions, are responsible for opinions that the deliberate investigations of experts have now shown to be exaggerated.

The Tsarevitch after the 10th of August was not only still an efficient ship, but no one was actually killed behind armour during the fight. She still figures amongst the effective Russian battleships.

The Russian ships in Port Arthur were not sunk by the Japanese howitzers, but by the Russians themselves.

I expect to be confronted with the battle of the " Sea of Japan " so I have a little quotation ready.

" The effect of shell fire on armour has been extremely small. " In the "Orel," which has been subjected to a very severe shell fire, " the 3-inch bulkheads and screens were of the greatest use in localis- " ing the effects. Two officers and twenty-two men were killed, and " eleven officers and sixty-four men wounded," not a very large percentage for a captured ship. The " Orel " now figures in the Japanese Navy List.

Some battleships capsized and sank, but this was clearly proved to be because their main belts were sunk below the waterline on account of their being overloaded with coal. They were thus practically reduced to the status of cruisers. Coal in its wrong place was also one of the great causes of the fires on the Russian fleet.

Again, long range fire has partially neutralized the advantage of moderate command. A Russian battery of five guns on the cliffs near Sebastopol, caused vast havoc to the British fleet, the ship simply could not fire at the battery at all.

The Japanese could not afford to risk anything against the shore batteries of Port Arthur, and yet the Nishiu and Kasuga, whilst bombarding Port Arthur over the Tiger's Tail with their primary armament, engaged and silenced a 6-inch Russian shore battery with their secondary.

We know in the old days, ships occasionally successfully attacked fortifications.

I have been told that on one occasion, the orders for the attack on the Dardanelles by the British fleet were drafted.

My conclusion is, that if certain circumstances arise, there is nothing inherently improbable in ships engaging a fortress, either with the idea of silencing the batteries, or more probably in order to disorganise the light Q.F. defences and thus prepare the way for a torpedo boat attack.

In the old days some of Nelson's captains claimed that if they could get in three broadsides in five minutes they would put their opponent out of action. Not a very great rate of fire compared with modern guns, and yet no modern battleship has been put hors de combat in five minutes.

I think on the whole, it is evident that ships, at any rate at the present moment, are not so very vulnerable, especially considering the 9·2″ is our largest modern gun mounted in fixed defences.

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I cannot, however, leave this part of my subject without pointing out the advantage ships have gained by the long ranges of modern guns.

Owing to being able to fire effectively at 10,000 yards or over, they can now often bring a converging fire on our batteries, and I may add that our modern mountings leave the greater part of the detachments absolutely exposed to such an attack. Moreover, no head cover is provided, a strange oversight when one thinks of the steep angle of descent of projectiles at long ranges. The lesson given by the destruction of the personnel of the unshielded guns of the "Variag" seems to have passed unnoticed by those responsible for our equipment.

If the arguments put forward have been followed and accepted, it must be conceded that our base ports are not completely free from liability to attack, and that this liability has been augmented, if not entirely occasioned, by the very considerable reduction in armament that has taken place simultaneously with the vast improvement in protection, not only in battleships, but in cruisers not designed to take their place in the line of battle, and, therefore, far more likely to be employed in raiding attacks.

As a corollary to the above, I suggest that, without any very heavy expenditure, it would be possible to make it extremely unlikely.

A great number of guns are not required, but those provided should be the most powerful of their kind.

Land service ordnance must keep pace with naval.

Attention was continually drawn during the Russo-Japanese war to the great difference between the effect of the 12-inch and smaller projectiles.

To sum up—to gain this reasonable probability of immunity from attack, the following conditions must be satisfied:—

1. The gun selected for primary armament must be equal in power to the best afloat.

This is necessary not only to deal with a direct attack, but also to prevent any torpedo boat raid receiving that close backing by larger ships, without which it cannot be pressed home with the same energy.

The actual number required depends very much on the siting, *e. g.*, Colombo, where the batteries are behind the harbour, is a more difficult place to defend than Plymouth Sound.

2. The secondary armament must be powerful enough to deal quickly with unarmoured vessels (boom smashers, &c.).

3. It is essential to mount a light Q.F. gun of sufficient power to place a destroyer hors de combat with one well placed shot.

4. Both secondary and light armament must be well protected, either by cover, or by the fire of the primary armament.

5. Protection from enfilade fire for gun detachments equal to that furnished in ships is a necessity.

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The case for the advanced bases is not quite similar.

One cannot be strong everywhere. The defences allotted to any advanced base must be entirely regulated by the value placed on it in our general scheme of defence, elaborated in peace time.

Now whilst the value of a base will remain practically constant, that of the advanced base will vary with the strategic situation, which in turn will depend on the national policy.

Hence a change in policy may suddenly enhance the value of a port, and make it worth an enemy's while to despatch against it an expeditionary force stronger than it is designed to discourage.

One thing is certain, the history of our naval wars is inseparably connected with the attack and defence of advanced bases.

Such attacks may be bad strategy, but it must be remembered national policy has in the past, often over-ruled the plans of the strategist, and will no doubt often do so in the future.

The acquisition of a few square miles of solid land has before now proved a very tangible asset when peace negotiations were opened, as for instance, when we exchanged Belleisle for Minorca.

It must be remembered too, that it is not good strategy for the weaker side to give battle, unless it can effect a dispersion of its antagonist's forces.

What simpler way of doing this is there than to despatch an expedition against a distant possession in the hope that he will weaken his main body by sending off a much stronger one to deal with it. If the stronger side knows that the fortress can hold out for a time, he is not likely to fall into the trap.

It was the enormous damage done by commerce destroyers in the West Indies that was accountable for the immense amount of fighting there in the eighteenth century, and commerce destroying is a branch of naval warfare that is still studied.

It would be a severe shock to our feelings to find one of our abandoned, or partially disarmed, advanced bases seized and held by an enemy, as a base for commerce destroyers.

We must now turn to the consideration of how the preceding in any way affects officers of branches other than the R.G.A.

This may be summed up as follows:—

Though our fixed armaments are weak enough to give a possible chance of success to a squadron small enough to elude the vigilance of our main fleet, yet the land defences of most of them are so very inadequate in both men and works, that it seems almost certain the real attack will fall there, though it may be covered by a feint on the batteries to prevent any withdrawal of troops to aid the land defence.

Even enumerating the names of fortresses that have so fallen would take too long, and again, these examples are a little beside the mark, because most of them fell as a result of prolonged operations.

Now the nation's existence depends on our maintaining maritime preponderance, and the fleet must save us from anything approaching a siege, which would necessitate more elaborate preparation, and an expedition so large and costly that its total loss would be a serious blow to our adversary.

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What we have no right to ask it to do is to protect us from the necessity of holding out for a short time against a direct assault, supported at most by field artillery.

Can we do so?

The precautionary period at home (that is before war is actually declared) is undoubtedly the most dangerous time.

The paucity of our batteries is accentuated by the utterly defenceless state of their land sides. The sailor in the past was always ready to put a battery out of action by a landing party, and this spirit is by no means dead. Every combined manœuvres sees similar attempts undertaken.

Orders were issued to the Japanese destroyers, when the first attack on the Russian fleet was made, that if any boat was damaged, the crew were to land and assault the Russian batteries; and rifles and bayonets were shipped specially for this purpose.

To meet land attacks, small drafts from various regiments, busily engaged in mobilising for the field army, are temporarily sent down. Neither officers nor men are previously acquainted with the place, or the officers commanding sections of defence, or any of the staff. As a rule in England, these drafts consist of the rawest of raw recruits, utterly unable to find their way about in the dark.

At Sheerness, the positions chosen to be held were utterly out of proportion to the scanty number of troops available, the flanks rested on the sea with a perfect disregard of the fact that any attack meant that the enemy must be in temporary local command.

If one lesson is particularly taught by the fighting round Port Arthur, it is the tremendous effect of a flanking fire from ships on troops engaged by land forces.

Abroad, we have greatly to rely on auxiliary troops, and their inadequate training is, as a rule, not directed towards a knowledge of the particular localities they would have to defend in war.

In many, I may almost say in most cases, ground round a fortress is particularly difficult to defend, and requires very special study. An intimate knowledge of locality is absolutely indispensable and but seldom acquired.

Allowance has to be made for the mobility of ships; the utter lack of fatigue with which feints can be made by the enemy; and the difficulties of moving reinforcements when the enemy has command of the sea. All these things will not be well considered "if "all ranks are not carefully trained beforehand."

If a very exact knowledge of the locality is not one of our assets, what have we to put in the scales against the advantages of picked troops, an homogeneous force, and a certainty of largely superior numbers.

I am conscious that I have dealt with a very grave subject in a most inadequate manner. If I have failed to carry conviction to my hearers, it must be put down to want of skill in advancing my arguments rather than to any fallacies in the arguments themselves.

The conclusions I have drawn have not lately been looked on with favour by those in authority.

The extreme views that led a few years ago to the large reduc-

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tions in armaments are, I believe, to be traced to a very great extent, to a single dominant brain.

Even great men, when they ignore the accumulated experiences of the past, are sometimes mistaken.

Horace put this idea very tersely when he wrote—"Vixere fortes ante Agamemnona Multi."

I trust I am not too sanguine in saying signs are not wanting at present which foretell a return to the saner methods of our forefathers, who believed the maintenance of our coast fortresses was inseparable from true maritime preponderance.

There is one other point in connection with the defence of fortresses that I mention with the greatest diffidence.

The primary object of the garrison should be not to inflict a defeat on the enemy unaided, but to prevent an important strategical position falling into an enemy's hands before relief can be sent.

This consideration must invariably receive full recognition in all tactical dispositions adopted, if the defence is to be brought to a successful conclusion.

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Some suggestions regarding the Training of R.A. Territorial Officers.

By "ARTILLERYMAN."

APART from the question of discipline, which is considered later in conjunction with training, a party of men only willingly follow a leader in whom they have confidence, one who has shown himself their superior in physical courage, ability, knowledge or other virile qualities. Of these qualities, physical courage, so far as the soldier is concerned, is generally esteemed the highest, and sixty to seventy years ago it was the only quality which was considered essential for an officer. But in these days of scientific soldiering it is hardly sufficient of itself, and further, to few do opportunities occur in peace of showing a superiority in this respect.

Still there are many other ways in which an officer can gain the confidence of his men and his title to leadership than a display of courage. He is responsible that his men are properly fed, properly housed, and properly clothed. It is true that the Army Service Corps provide the rations, the Royal Engineers the barracks or shelters, and the Army Clothing Department the uniforms; but it is for the officer to see that the rations are good and in sufficient quantity, that the camp or fortress is kept clean and habitable, and that the clothing is properly fitted and of good material. These are his first duties and in conjunction with those mentioned later referring to equipment are amongst the most important an officer is called on to perform. Yet they are frequently neglected and relegated to subordinates, more often through ignorance of their importance than from a desire to avoid an unpleasant duty. With the consequence, that the officer's influence is undermined and the confidence of his men shaken. For those not closely in touch with military life of the present day, there is an excuse for this neglect in that in the past it was customary for these duties to be performed by subordinates.

Then, an officer trains and instructs his men, and to do this efficiently he must not only be far in advance of them in military knowledge, but must be capable of impressing this fact on them. To instruct, one must be master of one's subject and master of one's self, and here we are faced with an initial difficulty. Many of the duties, in which the men must be instructed, are only to be acquired by practical experience, still the men have seldom more, and generally much less, practical experience than the officer. Therefore, granted a higher intelligence and the determination to succeed, the officer

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should soon overcome this initial difficulty, and gain rather than lose influence in the effort.

The training of men must be individual rather than collective, and the useless reiteration and constant repetition of the barrack square replaced by a well considered and carefully graduated syllabus which will allow of greater time and attention being bestowed on the indifferently educated without retarding the more advanced. It must be realised that no two individuals can absorb the same amount of knowledge in the same period of time, and consequently, the officer must acquire a personal knowledge of the capacity of each of his subordinates.

As a general rule, an officer should work through his non-commissioned officers, but this is not always possible or profitable with irregular troops, as only N.C.O's of tried capacity can be trusted to efficiently instruct, and the N.C.O's of our Territorial Forces, though of excellent material, are often lacking in that self confidence essential for an instructor.

It is not only necessary for an officer to be acquainted with the duties of all under his command; he must have, in addition, some practical knowledge of *how* they are carried out, and thus learn to appreciate the work of his subordinates and to recognise instinctively the limits of their powers, which he is careful not to over strain. This enables work to be got through with a minimum of effort, obviates friction and promotes good feeling. The soldiers, conscious that their work is fully appreciated can be called on for their last effort without unduly approaching the "breaking strain." In a word, it teaches the officer the exact worth of the instrument which he has to use.

There is another almost indispensable characteristic conferred by an intimate knowledge of the technicalities of his profession, and that is the power of quickly arriving at a correct decision. Unlike the questions which we mostly deal with in civil life, military questions admit of no delay and may occasionally demand instantaneous action. Ignorance in such cases can but lead to disaster. To judge correctly and quickly it is necessary to be able to form an instantaneous mental picture of the various issues at stake, and to do this, knowledge and knowledge only, is the absolutely indispensable factor. There are, it is needless to add, many others which are of considerable moment, such as a trained intellect capable of logical reasoning, self-reliance, determination, &c., but none of these can replace knowledge; they are merely supplementary. Turning for a moment to civilian pursuits, where the relations between the subordinates and superiors are analagous to those existing in the service, we find that the working hands in a large factory carry out without question the orders of the foreman, the foreman the orders of the manager, and so on. No special regulations are required to ensure the ready obedience of the subordinates. It is true there is the question of dismissal and consequent loss of pay, but it is doubtful if this has as much power in compelling obedience as the higher knowledge of the superior and his wider grasp of all the questions which are brought forward for decision.

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Beyond these duties of an officer in relation to his men, which have been briefly dealt with, there are others almost equally important, referring to the chain of command and the chain of administration, which latter includes interior economy. Even to the regular officer, whose work brings him almost daily into contact with these matters, they are not very easy of comprehension; how far harder is it then for the Territorial officer whose knowledge must be almost entirely based on theoretical instruction. This theoretical instruction to be of value must be directed towards gaining a knowledge of principles, by the close study of the Regulations and Training Manuals, whilst concurrently, an endeavour is made to deduce the reasons on which these principles are based.

Thus the relations between a fortress, fire, battery and group commander, and their various duties, are clearly and concisely laid down in the training manual, but a perfect knowledge of the letter-press, though of great assistance, would hardly fit an officer to undertake any of the duties unless he had, at the same time, endeavoured to grasp the principles underlying the rules and the reasons which form the foundation of the principles. Similarly with the chain of "Command" in field units. The necessity for the Adjutant, his position, responsibilities and powers, and his relations to the commanders of companies. Then upward in the " chain," the similar position and duties of the staff officers between the officers commanding battalions or artillery brigades and the Brigadiers or Divisional C.R.A's, and between the Colonels of brigades or Divisional C.R.A's and Divisional Generals. These are matters which are by no means easy to grasp by civilians, whose practical experience of the army and its ways is often limited to having been spectators at one or two reviews or manœuvres, and whose theoretical knowledge is founded on the popular accounts of the Franco-Prussian or the Russo-Japanese Wars. Yet the friction, misunderstandings and delay, which ignorance of the functions of the various links in the chain of command may occasion, can only be really appreciated by those who have been the unfortunate victims of it, and we have but to turn to the records of our latest war, South Africa, to find ample justification of the importance which should be attached to this part of the subject. As with the chain of command, so with that of administration though, perhaps, in this case it is more self-evident that a knowledge of at least the principles, if not the details, is a necessity. Yet it is far less understood as a whole by officers of irregular corps and far less attention is paid to it than to drill and tactics, because it is more difficult to grasp, and except to certain intellects, is dull and uninteresting as it deals with materials and not men. It would have been more reasonable to suppose that the Territorial officers, being drawn from the business and professional classes, would have found congenial occupation in making themselves acquainted with the administrative methods of the army; but there are two reasons why this supposition is found to be so generally fallacious.

First and foremost that the majority of officers joining the Territorial Forces do so not so much from motives of patriotism as from a desire to find pleasant and at the same time worthy occupation for

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their leisure time. It is consequently easily understood that, to them, there is no inclination to study administration, but rather strategy, tactics and drill, the more interesting side of soldiering which offers them change of occupation and change of ideas. The second reason is, tnat civilians often approach army administration with preconceived ideas of its unsoundness. These ideas which are based on the erroneous impressions conveyed through the medium of the press, by self-constituted and often lamentably misinformed critics, bring about an unfortunate result. When a Territorial officer finds some administrative regulations which apply to his command, but which he considers are not exactly suitable, influenced by his preconceived notions, he condemns the whole system as unsound and cumbersome; and, seizes this as an excuse for ceasing to study it, quite forgetting, that army administration is the fruit of the labours of generations of highly educated soldiers; that it is based very largely on war experience; and is intended, not so much to administer his own small territorial unit as, to feed, clothe, and maintain an army, scattered throughout a vast territory and serving under every imaginable condition of climate.

It is the duty of the Territorial officer to approach the Regulations governing the administration of the army in a loyal spirit, and to avoid destructive criticism. To remember that a knowledge of administration will more than repay any time spent in acquiring it, for it teaches him how to obtain his ammunition, equipment, supplies, tools, stationery, &c., and how to account for them, and without this knowledge he will fail.

In the case of an officer of the R.G.A. (T.) allotted to a coast fortress, there are certain other matters which are special to his branch. Such as fire discipline and fire tactics of guns of position; the position of the deep water channels and by what guns they are commanded both by day and night; the position of the electric lights, their tactical employment in conjunction with the guns; the fire control and fire direction of the Q.F. defence, as well as the system of "Alarm" and "Lookouts"; the control of traffic; the position and functions of the port war signal station; and the general working of the examination service, should there be one.

This sounds a formidable list of what has to be learnt by the R.G.A. (T.), but if we compare it with what is required of the Territorial officers in the field we find that officers of the R.G.A. have great advantage over their comrades of the other branches. The tasks of the R.G.A. are definite and circumscribed. Knowing the fortress to which he is allotted, an R.G.A. (T.) officer knows exactly what his problems in war will be, and he can devote the whole of his energies in peace to their solution. The field of knowledge he has to traverse may be wide, the problems to be solved numerous and difficult, but they have definite limits and undergo little fundamental change by the improvements in material.

In the other arms of the service, war presents problems unlimited in number and variable in form. Advanced guards, flank guards, rear guards, outposts, reconnaissance, attack and defence, all of which may be carried out over any class of country and under any

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conditions of weather. No definite rules can be formulated to meet these ever changing conditions. Principles only can be laid down, and these must be applied in a modified form to each problem as it presents itself.

Similarly with the preparations for war. The war stations for the R.G.A. are fixed and the arrangements for equipping and moving a unit to its war station can be perfected to the smallest details in peace. The war station for the field troops is wherever the strategical concentration is ordered, and this must perforce remain unknown.

It is the duty then of the Territorial officer to realise, that he is unfit to command until he has endeavoured to perfect himself in the knowledge of his profession. That to gain the confidence of his men, and to be their leader, he must show himself their superior in knowledge, that without knowledge it will be impossible for him to exercise the highest function of a leader and to direct the efforts of his subordinates so as to ensure concerted and concentrated action.

These principles are not new. They underlie the teachings of all the great military leaders, are constantly found enunciated by eminent writers on military subjects, and have been confirmed in every struggle of which we have records.

The Duke of Wellington, in conversation with J. W. Croker, remarked [1]:—

"There are very few men in the army who knew these details (mostly administrative) better than I did; it is the foundation of all military knowledge."

In writing to the Confederate President, in March, 1863, General R. E. Lee said [2]:—"The great difficulty I find is in causing orders and regulations to be obeyed. This arises not from a spirit of disobedience, but from ignorance."

"Superior social rank and wealth will add immensely to the influence of officers over their men; but if these men are to rely on and obey them in action, the officers must have gained their confidence by attention to them in quarters and camp, and by making professional efficiency a point of honour. In nothing is knowledge more truly power than in the command of men."[3]

TRAINING.

In the past, military training had one aim only in view to produce a soldier, who could manœuvre with the steadiness of an automaton, and in whom obedience was an instinct. The means adopted for this end were drill—close order on the barrack square—and severe punishments for disobedience, and these means were in many cases most effective. It only remained for a leader to add the spark of animation by his personality or, by appealing to the baser passions of human nature such as love of plunder, revenge, &c., and the machine was ready to his hand.

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[1] Croker i. 387.

[2] "Memoirs of Robert E. Lee," p. 619.

[3] Sir Herbert Maxwell's "Life of Wellington," p. 176, Vol. I.

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Steadiness and obedience still rank high among the qualities of a soldier; but they are completely overshadowed by two others, which modern methods now demand—initiative and technical knowledge. It is convenient to consider these requirements under two main headings, discipline and knowledge, and it is proposed to follow this division generally in discussing the training of officers.

Discipline, which will be considered first, is of two natures. The stern repressive discipline which enforces obedience by punishments, and induces steadiness by perpetual close order drill continued until physical movement becomes mechanical, and the discipline founded on a reasoned appreciation of its vital necessity to an army, combined with a determination to co-operate in every way in maintaining it.

It is clear that officers of the Territorial forces have not the time to submit themselves to the continual close order drill required in the first instance, nor would they be attracted by a discipline upheld by punishment, therefore they must be disciplined by some other method. Glancing back into the past for a moment we find that this stern repressive discipline often failed. After Talavera, General Cuesta dissatisfied with the behaviour of the Spanish troops in the field, decided to decimate them, and had actually shot fifty or sixty men before the remonstrances of Wellington put an end to the butchery; yet the behaviour of the Spanish troops in the face of the enemy was often the reverse of satisfactory, and their conduct on nearly all occasions was marked by very great unsteadiness. A result which cannot in any way be attributed to a lack of soldierly qualities, as under certain conditions both the men and officers of the Spanish armies showed conspicuous gallantry.

At Jena, Napoleon's conscripts were inferior to the Prussians in discipline and drill, yet the result was never in doubt for a moment. After the campaign of Salamanca, Wellington published an order to the effect that "the discipline of the army had fallen off in a greater "degree than in any army with which he had ever served or of which "he had ever read." Yet this was after a victorious campaign, and the punishments then in vogue in the English army were such as would now be considered savage and brutal in the highest degree. Six hundred lashes could be awarded, and contemporary writers often describe how men died under the lash.

In our own Civil War of the seventeenth century we had an example of the difference in discipline of opposing forces fighting under similar conditions. The Ironsides under Cromwell, probably the best disciplined force that ever fought, and cavaliers under the King distinguished for their lawlessness. Yet both were probably subject to similar punishments for disobedience and equally drilled, at all events at the commencement of the operations. The difference apparently being due to the Ironsides having imbibed some of the stern fanatical spirit of their leader, whilst the Royalists were affected by the somewhat dissolute habits of the merry Monarch.

The Duke of Wellington considered that it would be impossible to maintain discipline in the English army without the lash, or an army worthy of the name, except by long service. Both these opinions by one of our greatest soldiers have proved fallacious, and

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it would seem rather from the few examples we have been considering, that the discipline required for the battlefield was more a matter of the "Spirit of the leaders" than of the regulations under which the army was serving, or of the extent to which it had been drilled. And when this discipline engendered by the lash and close-order drill was too highly strained and broke down, the resulting chaos can be more easily imagined than described; as witness the disorders which occurred in the English army after the successful sieges of Badajoz and Ciudad Rodrigo. Assuming that our conclusion is correct, that discipline is more a matter of the "spirit of the leaders," it follows that the training of our Territorial officers must be principally directed towards imbuing them with this spirit.

As a race, the English though strongly democratic, still bow to the power of wealth and social position; consequently the aspirant for a commission should belong to the ruling classes. The rank and file do not readily obey one of their own class temporarily placed (for it can be but temporarily until mobilisation takes place) above them, nor can it be expected that anyone unaccustomed to the cloak of power and responsibility in private life, will be able to successfully assume it for some few weeks in each year. It is not as if this difficulty were in any way peculiar to England. The same difficulty is experienced in Switzerland, only to a greater degree; and it always will be experienced except in the ranks of a professional army. We are also one of the most law-abiding of nations, and love order for order's sake—a valuable characteristic for a soldier. Further, the system of training in our public schools, and our love of games, inculcate the germs of discipline and teach the inestimable value of collective effort.

After nomination, the most important period of the young officer's whole career commences, the time when he receives his first impressions—impressions which will last him throughout, and which will form the ground work of his after education; but he must first be prepared for these early impressions by being assisted in overcoming, what Colonel Henderson calls "the complacency of the amateur." If a body of ordinarily well-educated men suddenly proposed to qualify themselves as lawyers, doctors, architects or surveyors, by spending a few hours of their spare time on the theory of the work, and fifteen days of the year in the practical portion, their proposals would be received with incredulity if not with scorn. Yet it is more than doubtful, if any of these professions mentioned are more technical, or require more deep study to master than the profession of arms. Let this be most carefully impressed on the young officer, let him realise that he is joining a serious profession in which he will be responsible for the lives of those under him—a profession in which ignorance is a crime, as it will not only involve himself in disaster, but others.

Then let him commence his drill with regulars not with Territorial troops. There will no doubt be difficulties in arranging this, but they should not prove insuperable. The drills need not be on consecutive days, nor should any attempt be made to render the young officer proficient at drill, in the sense that a recruit is made

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proficient. It must be understood that whenever possible the exercises are practised in the officer's own time, and that the drilling with troops is intended more to enable him to absorb the spirit of discipline and subordination, as in the Regulars, than to gain mere manual dexterity. Similarly with the first fifteen days camp—it should be with Regulars, so that an officer joins his Territorial regiment knowing the ways and methods of regulars, and having absorbed some of their spirit.

Foreign nations to whom these questions have been of more vital importance in the past than to us, unanimously arrived at the conclusion that officers should pass through the ranks. We have not sufficient time to carry this out, nor considering our national characteristics is it altogether desirable or necessary, but it is most desirable that we should substitute the best method available, and that is for our Territorial officers to get their earliest impressions from regular troops.

During his preliminary drills a young officer should, if possible, live in the officers' mess, and he should be encouraged to wear his uniform. His progress will largely depend on the amount of work he can do in his own time, as the actual time he is under instruction, according to the regulations, is little more than sufficient to suggest to him the best manner in which to direct his studies. Depression range finding, and the automatic sight in the R.G.A., &c., &c., and range taking and signalling, &c., in the R.F.A., are all interesting to the newly joined, and the young officer should be encouraged to interest himself in them without being in any way pressed to go through a regular course. His studies in military history should be directed more towards problems dealing with minor tactics and small operations, than with the larger campaigns, and especially towards the administrative and disciplinary side of the operations, with a view to making him realise the wide technical knowledge required by officers at the present day, the very great difficulties that arise on active service, and the grave disasters which result from ignorance.

As I have said the first fifteen days camp should be with the Regulars, and it is important that the young officer should be given some small command to assist him in gaining the necessary confidence in himself to command men, and to show him the manner in which his orders should be executed.

Even if this brief training only succeeds in bringing before him the difficulties of the profession in which he proposes to qualify, much will have been gained. He will understand that there is more in an officer's life than the mere wearing of a smart uniform and giving orders. He may begin to realise, if he is wise, that it is the knowledge behind the order which compels obedience; that the highest form of discipline is not the mere blind obedience of a soldier to his superior in rank, but rather that the soldier recognises and has confidence in the superior knowledge of his officer. The deeper insight the young Territorial officer can obtain into military life in the Regulars, the better for his after career. In the time at his disposal, he cannot hope to learn how the administrative work is done, but he may learn what has to be done, and this will help him in deciding

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how to direct his energies. If time permit he should be given a definite task to work out in connection with the pay list, clothing, or equipment, to enable him to grasp the principle of these accounts. The detailed application of them being learnt later with his unit. It must be remembered throughout that he cannot be forced to learn, only encouraged to do so.

In the Territorial infantry much has been done by week-end camps. Could not the system be applied more freely in the Field and Garrison Artillery? The opportunities are even more favourable.

A week-end camp established at many of our coast fortresses would, I feel sure, be popular especially in the summer months, when in addition to learning his work, a R.G.A. officer would have the advantage of being near the sea, and be able to combine pleasure with business. An efficient instructor is essential, and the field of instruction must be as little restricted as possible. Actual gun drill soon becomes wearisome and depressing, but brief lectures on the uses of guns and ammunition; the strategic value of the fortress; the tactics of the defence; intelligence work; the application of military history to modern requirements of fortresses; &c., offer almost inexhaustible subjects of even greater interest to the amateur than to the regular. It is true that there may often be a difficulty in finding an efficient instructor in these matters, but this could be overcome by offering a little extra pay from the training grant to officers, who would undertake the work, and the supervision might safely be entrusted to the General Staff Officers of the Command. So also with the R.F.A. officer a scheme suitable to his duties might be evolved.

Much has been done and is being done by schools of instruction, but these week-end camps would be supplementary and might be attended by many officers, who could not attend the schools. Whenever a sufficient number of R.G.A. officers are present small regimental exercises could be held in connection with the coast defences, but care must be taken that the problems are as far as possible similar to those the officer might be called on to solve in war, and are not of too ambitious a nature. Amateur officers and even professionals are inclined to overlook the many essential details required in actual warfare to carry out a successful operation—details, which are not prominently brought to notice in a regimental exercise, where paper troops are being handled.

There is a great danger of the amateur becoming academic. He begins to assume that if he can write good orders he can win a battle. If in command of two or more small forces or detachments, he hands over command to his subordinates, and congratulates himself on having acted soundly in thus boldly carrying out the principle of decentralisation of authority. Thus allowing his rigid adherence to a principle, to entirely obscure the less prominent, though even more valuable lesson of military history, that it is the energy, determination, and often actual presence of the commander, which bring operations to a successful issue.

The commander of an army, or even perhaps of a division, may "make war on a map," but it is unsafe for the commander of smaller bodies to relinquish the actual and personal command.

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To briefly summarise our conclusions :—

1. A Territorial officer must be made to realise the seriousness of the profession of Arms and should receive his early training with Regulars.

2. He should be granted, where possible, greater facilities for instruction.

3. His instructor should endeavour rather to indicate to him lines of study than to make him proficient in the brief time available.

4. And lastly an officer must realise that an army with ignorant officers is doomed to disaster ere it takes the field, and that nothing can discipline an army or lead it to success if its officers are ignorant of their profession. Knowledge, and knowledge only, confers the power that leads to success in war.

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The New Pacific in 1899 and 1909;

A Study in International Strategy.

(A Lecture delivered at the Royal Artillery Institution, on Thursday, 16th December, 1909).

By T. MILLER MAGUIRE, Esq., LL.D., M.A.

Major-General Sir A. E. Turner, K.C.B., R.A., in the Chair.

THE CHAIRMAN: General Belfield, ladies and gentlemen; when I received the kind invitation to preside at this lecture I felt a considerable amount of hesitation in accepting, as I have another engagement in London to-night, but I was very anxious to visit the R.A. Institution once more as I have very tender memories of it, because when I joined from Addiscombe, my first military duties took place in these premises. I was also very anxious to hear this lecture from my old friend Dr. Maguire. If I have to leave before the end of the lecture, General Belfield has kindly promised to take the chair. I am obliged formally to introduce Dr. Maguire, but there is no need to do so as he is well known on account of his great research, industry, and ability. As to the subject of the lecture and how the British Empire may be affected thereby is buried in the womb of the future; but Dr. Maguire would have us wake up and not ignore the signs of the times. "Coming events cast their shadows before," and he would have us prepare to meet any emergencies that may come to us, and tells us if we wish to preserve intact the great heritage we have from our forefathers we must shirk nothing which the preservation of the Empire entails upon us when the honour and greatness of that Empire is involved. I am sure you will agree with him. (Applause).

THE LECTURER: Nothing connected with policy or arms can exceed the vital importance of the topic on which I have the honour of addressing my distinguished audience of the Royal Artillery, whose efficiency is vital to our national existence, because on their able management of all the most terrible engines of war depends the future of our race. A series of events which have been publicly discussed since the announcement of this lecture emphasise the appropriateness and foresight of the selection of my subject by the authorities of the Institution.

It was my duty to prove here and elsewhere before the war of 1898 between the United States and Spain, that the West Indies were then, as in 1805 and in 1780-2, the nerve centres of international strategy. That war ended for the Latin races all chance of resuming the Empire of the Pacific, which they had first discovered and in

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whose isles and by whose shores they had founded and preserved a great Empire under difficulties of transport and navigation now almost inconceivable.

My views were ably supported by Captain Mahan in a series of very able articles called the "Interest of America in Sea Power," published in 1894-7, in which he insisted on the acquisition by his country of strong strategic positions in the West Indies and across the Pacific, in the Hawaiin group for example. He also laughed to scorn the theories of the Manchester School, scoffed at the so-called humanitarianism of English parties and maintained that if the Anglo-Saxon races were not always prepared for war, desperate and offensive if need be, their ruin would be finally assured, and that before very long.

We ventured also to point out in 1899 that the opening of the Panama Canal, which is now promised, after necessarily long delays, for 1912, must change the strategic situation even more than the opening of the Suez Canal, and that England should prepare for this contingency. Already the United States are preparing for all contingencies, and hence have become, since 1899, a new power of a new species.

It was also clear to many thinkers, including the best German writers, that a new Power of a new species had sprung into potency in 1895, when Japan so rapidly overwhelmed China. The action of the powers in "chousing" the Japanese out of the fruits of their victory was only a temporary surprise and could not put back the hand of Time.

The awe of Russia which made Germany timorous about its eastern frontier and England to look with dread towards Samarkand and Merv did not pervade the Japanese breast; and in 1899 the posture of international affairs may be roughly summarised thus:—

France, owing to her relative naval inferiority, so far reaching is command of the sea, had to abandon her enterprise in Fashoda. The British policy in the Far East, like that of the other Western European States, was one of shilly-shally, of "open doors," and spheres of influence, and diplomatic dodgery and utter futility.

Our diplomatists were trembling with fear of Russia, which had been allowed to enter Port Arthur and was about to make Dalny a great commercial port, and was hurrying up, with rare foresight and ability, the construction of a railway which was to link the Pacific and indeed its inland Chinese seas, and the abode of the Yellow Race, with Moscow and St. Petersburg.

In regard to the Fashoda incident, and indeed, later on in regard to South African complications and wars, England had the moral support of the United States, even as with regard to the Spanish War the United States had the support of England. This support, at that juncture, was of the utmost value, indeed, in consequence Admiral Dewey made light of any German influence and ruined Montogo's fleet and seized the Philippines, even as Cervera's fleet was ruined in the West Indian Archipelago.

Japan had to bow before the combined power of Germany, France, and Russia, but began to get together a fleet which could

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cope with and annihilate in detail the dispersed Muscovite squadrons. The Mikado introduced far-reaching obligatory service with the hearty assent of a patriotic population, and revived in the close of the nineteenth century the chivalry of the middle ages in a higher and far more popular form under the name of Bushido. England was occupied might and main in the end of 1899 with a humiliating struggle against a power of incomparably inferior resources merely because her politicians would persist in relying on Sea Power, on Hague Conventions, on humanitarian philosophy, and on the paltry theory of de Bloch, that modern weapons would render war impossible. Hence she wasted £250,000,000 on a war, which, if the advice of soldiers and sage politicians had been taken betimes could not have cost £40,000,000.

In the beginning of the year 1899, in spite of recent experiences and of the advance of Russia and the fall of China and of Spain, we heard charlatans teaching publicly that the United Kingdom would not for generations be required to have any larger over-sea army than 60,000 engineers, artillery, and infantry, and fifteen thousand horses, and that cavalry and the bayonet were out of date. We were also taught officially that Russia could not put 200,000 men on the frontier of Afghanistan for half a century. Well, we put 400,000 men and lost at least 200,000 animals in South Africa within two years, and Russia by March, 1905, had placed at least 500,000 men in Manchuria, and Japan had placed oversea 600,000 men in the same Far Eastern land.

Macaulay and many another self complacent author had taught us in spite of the historical records of Gibbon and of Huns and Mongols, and the annals of the Turks, that no numbers of Asiatics could cope with the invincible armies of Europe. But the Japanese had beaten the strongest European Power, whose resources were three fold, in every battle by land and sea by the beginning of 1905. They had proved their superiority to their European enemies in regard to organisation, mobilisation, commissariat, strategy, tactics, staff, intelligence, and the prompt and skilful use of all the most tremendous and marvelous appliances of modern civilization.

Since 1864, when they had been humiliated, as was Prussia in 1806, they had sedulously followed Learning and Knowledge, and worshipped them, wherever they might be found. They had sought for wisdom in whatsoever shrine that goddess was adorned.

The ardent eastern votaries of Minerva had travelled after invention and instruction over every sea and land from the banks of the Elbe to the Thames and the Hudson. Once more wisdom was justified of its children. Asia was resurgent. The Rising Sun of the Yellow Race became the Risen Sun. Which certainly threatens—if China follows Japan—to obscure in the Pacific, in spite of every alliance, the brightness of Anglo-Saxon fame.

In the present week the future is a subject of the very gravest anxiety to the champions of the Stars and Stripes. Japan is only seventeen days away from the Pacific coast. Look how England sent forces from every isle of the sea and stores and ammunition from

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every continent to South Africa. The Americans are now for strategic as well as commercial reasons doing all they can to secure for themselves all their links across the Pacific and preparing powerful striking naval and military forces which will secure for them undisputed command of the Panama Canal. Meanwhile the Washington authorities by way of precaution are proposing to fortify Pearl Harbour in Honolulu, and to erect powerful forts at the entrance to Chesapeake Bay. Their own operations over sea in 1898 in the Philippines and at Cuba, and the enormous migrations of men and horses within five weeks from not only the United Kingdom, but also the Mediterranean and India and Australia and Canada to South Africa, and the fact that the Japanese were fighting on the Yalu and closing up Port Arthur, by land as well as by sea, within four months of the commencement of hostilities in 1904 are stupendous exemplifications of the value of command of the sea, and of being ready when war breaks out. They far surpass anything conceivable in 1854, when it took our relations as long to get to the Crimea as it would now take us to get to Hong Kong. At any rate a study of military history since 1899 has convinced the United States that their Monroe doctrine would not by itself produce much effect without guns to support its arguments as against the Germans, who can reach their Atlantic coast in a week, or against the Japanese who are not a longer journey from San Francisco than was Southampton from the Cape. Deeds and not words prove the right now-a-days. If International Law had any weight, the Monroe doctrine would die out at once, but it is alive and annoys other races. Since 1899, therefore, Germany, with its tremendous commercial and naval development, in the former aspect greater than France, Italy and Russia put together, and the United States and Japan have become new powers of new species. (See Appendix I.). These three communities have relatively made tremendous strides since 1895, not to go back so far as 1870, 1871, and the Franco-German War.

Though the United States are tainted by democratic corruption and plutocratic ideals which are the reverse of Bushido, yet its leading men see clearly and preach honestly the whole truth. Hence they may recover and be worthy of their destiny, otherwise they bought the Mississippi basin in 1803 from Napoleon in vain.

Under the present system, has the sea power which dominated the Mediterranean, Atlantic and Pacific in 1870, and whose naval and imperial expansion and powers then surpassed all other Empires ancient and modern, kept pace with its rivals? Has the British Empire been true to itself and to its responsibilities? We shall soon see.

Meanwhile, fancying that we had absolute and uncontrolled and uncontrollable command of the sea, which we had not, and which we have not to anything approaching the extent secured by our ancestors in 1589 or 1709, or 1759, 1809, or 1859, or 1899, our misled people—torpid with wealth, violent with ignorance, besotted with the worship of games, despising the cult of brain power, and learning and science and their professors, promulgated and relied upon the ridiculous, the insane, Blue Water School, now as dead as the Dodo.

I may congratulate this Institution and myself that we discussed

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here and utterly repudiated that doctrine fifteen years ago, when it was the solace of complacent and contemptible optimists and vote-catching charlatans.

Sea power is vital to us. Without its protection (owing to the madness of political sophistry and vote-catching mendacity), we would have riots for lack of bread in four weeks from now, as was clearly proved in the discussion on "Food Supply in Time of War," in the Royal United Service Institution a few weeks ago. Sea power is sufficient when an Admiral, as in 1808 or 1898 or in 1904, can inform his Government that it can send its troopships and other transports across the sea and disembark its soldiers without any risk of attack by any hostile fleet.

This power is very good, and this power, said Lord Bacon, the most illustrious British sage, three hundred years ago, is the principal heritage of Great Britain, and, as between Japan and Chemulpo and the Liao Tung Peninsula, it was secured for Japan by the end of the first month of the war in 1904.

But one of the most impressive oracles of time is that sea and land power are not antagonistic, that one is the complement of the other, and that never once in history did sea power alone conquer any resolute continental State, or maintain the greatness of any insular State, or even capture any great maritime fortress. Did Trafalgar conquer Napoleon? What about the Peninsula War and Russia and Waterloo? Did sea power conquer Rome or Carthage or Constantinople? Did sea power capture Sebastopol? Did Federal sea power conquer the Confederates? What influence had sea power on the Franco-German War? Did sea power take Santiago? Did it take Port Arthur?

At last, however, the Blue Water School has evaporated, and it was officially announced, when the boom for Territorials was manœuvred in the beginning of 1909, that the object of the force was to defend our Isles in the event of invasion!

Consequently, history proves that the services of the navy may, for a while at least, not protect a nation and security must depend on an army, and the Americo-Spanish and Japanese wars since 1898 prove, as did the old Grecian and Roman and Napoleonic wars, that the most powerful navy must be supplemented by military expeditions either combined or apart, if the fruits of victory are to be gathered. So the Elizabethan heroes were not content with repulsing the Armada, they proceeded to singe the King of Spain's beard from Cadiz to the Isthmus of Central America, and the English at the close of the Seven Years War proceeded to capture Quebec and Havannah and Manilla.

It would be interesting to trace the expansion towards the Pacific of so many races since Nunez de Balbao, in 1523, and all his men looked on each other with a wild surprise, as first of all Europeans, they silently surveyed its vast expanse upon the hill Quarema, that Peak in Darien, and then the bold chief and explorer rushed into its waters and, waving his sword in all directions, claimed all its coasts for his king, and indeed, the Spaniards thenceforward ruled all its waves from California to Patagonia till the days of Napoleon.

The rise of the various Republics from Mexico south are of

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very modern date, since 1820, and of very troubled history throughout. They have been seething with revolutions, and, indeed, are involved in warfare as I speak.

Alaska and the Klondyke gold industry, Behring Sea fishery questions, and British Columbia's wealth, and the rise of San Francisco, are all of very modern date. We only secured Vancouver in the days of the younger Pitt and since then our diplomacy has been contemptible alike in the Pacific and Atlantic slopes of North America. The Ashburton and Alverstone awards, and how we let Alaska slip out of our hands, and how the Northern Pacific Railway, now of such tremendous importance, was built in spite of our Government, are notorious, but at present a new spirit is prevailing, not only in Canada, but at home. Even anti-militarism, like the Blue Water School, is becoming a mere catch-vote cry of no real significance.

Nevertheless, there have been Press and Imperial Conferences lately which have been the very acme of absurdity. As an eloquent Canadian said, they were mountains of labour and only brought forth mice. Indeed, the Blue Book in my hand, reporting the proceedings of the Imperial Conference is a masterpiece of the inane, and its authors seem to be utterly unaware of the present state of international strategy. They assume that it is quite impossible that Japan or America should ever be against us. They ignore the future of China.

Far wiser was the notable contribution to international strategy of Captain D. Macaulay, of Skinner's Horse, at the Royal Asiatic Society last month.

Look at the map of Empire, the wiseacres in London discussed strategy without reflecting that even as after the discovery of America, the centre of world policy shifted from the Mediterranean to the Atlantic, so since 1899 the centre of world policy has shifted from the Atlantic to the Pacific.

Now look at Canada, Australia, the Cape, and India. The Imperial and Press Conferences ignored the importance of India, which has hitherto been regarded as the first aim of every great conqueror from Alexander to Tamerlane, and from Vasco de Gama to Napoleon and Skobeloff, see the relation of India, Ceylon, Singapore and Hong Kong, to that great ocean whose waters glitter with precious stones, and "whose shores are fringed with gold," as Alexander the Great told his soldiers. The sober reality now turns out to be far beyond the utmost wealth of Ormus or of Ind or of all that Portuguese or Spanish or Dutch ever conceived in their wildest dreams of conquest or avarice.

Now tell me if Captain Macaulay is not wiser than all Downing Street, and if naval and military basis of commanding influence be thereby located, whether they could not enable our Empire to play a powerful part in the future of the Pacific Ocean, which phrase of course includes its bays and harbours and inland seas.

The United States of America are becoming very wide awake indeed, and if they close their eyes, Canada, we trust, will keep her eyes open. This week we learn that Panama is marked to come under the rule of the United States, and the annexation of Hawaii, and similar strokes of policy were just as aggressive and as Machiavellian

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as anything done by European monarchies with regard to Poland or Finland or the Balkan States.

But they are necessary if the control of the canal and of the Pacific are not to pass into other hands and a summary end be put to both the principle and the practice of the Monroe doctrine. When the United States captured the Philippines, the centre of gravity of their realm changed from New York to San Francisco, and their present operations as to Panama and Nicaragua, and their refusal of aid from Mexico with regard to Nicaragua, and their obvious design to enhance their naval and army strength and efficiency are evidence that they are willing and ready to repeat if need be the enormous struggle and losses of their Civil War. In regard to foreign policy as well as home, bureaucratic democracies have always been the most terrible forms of tyranny.

Now look at the Hawaiian group, and Wake Island, and Guam Islands, and contemplate how the States are linking up their Pacific coast with Asia, and study the progress of their fleet through the Pacific, and then weigh the Monroe doctrine and its consequences and tell me if the statesmen at Washington since 1899 have not been copying the policy of getting ready for international contingencies which Bismarck pursued after 1866. I don't blame them—I admire them rather.

But notwithstanding all these movements, other writers have recently declared that it is all very well to talk with contempt of Europe, and to talk of ousting such a decadent power as England from its share in the Inter-Oceanic Canal under the Clayton-Bulwer Treaty, or of bluffing feeble anarchic Republics like Panama and Nicaragua, but if they don't look very sharp and change talk into strength and organise their resources and adopt Bushido, Japan and China will wipe them out.

I am glad to see that Australian and Canadian statesmen hold similar views and are only too anxious to adopt universal military service, to get up navies, to put an end to gambling, and secure generations of healthy and high-spirited mothers fit to give birth to men and to rear warriors.

The men who are most interested in the Panama Canal's future success, which will cost about £80,000,000, are starting it by making Panama a dependancy of the United States, or by at least giving the American Government complete control of its domestic affairs. This policy, coupled with the Nicaragua policy, tends to increase Central American suspicion that the ambitious Imperialist Republic will soon attempt to bring all the Central American States under their control. As it is the Monroe doctrine implies chieftainship and guardianship over all America except Canada.

Fortunately the Manchester School of sweaters and nincompoops have not succeeded in alienating Canada. Canada has enormous advantages, both as to the Atlantic and the Pacific. Its eastern territory juts out nearer to Europe than the United States, and its western harbours are nearer Japan and the most prosperous ports of China than is San Francisco, and at both ends there is abundance of coal, corn, wood, fish, and meat.

It is true, the United States in the sixties, through the lack of

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foresight and imagination of our party charlatans were allowed to buy Alaska, from Russia for £1,000,000. They thus gained ten times the amount in fisheries alone, but still Canada has held on to Klondyke and to British Columbia and has developed to a surprising extent in every way, and Mahan admits the value of Esquimalt as a naval base, though neglected by the British, and, I am told, Prince Rupert is also a very fine and safe harbour.

There is a distinct advantage to traffic from Liverpool to Quebec, 2620 miles, as compared with the Liverpool and New York, 3020. Moreover, in *Nova Scotia there is coal*, and at the beginning of the reign of Queen Victoria, *coal became to sea power what victuals are to armies.* Lord Roberts was telling me about the small ship in which he went to India, a ship of about 600 tons. Some of you gentlemen can contrast that boat with the ships in which you went to South Africa, in which you could put a couple of battalions. Transit across the sea by big steamers opened up the coal question to an enormous extent, and the coal question enters every detail of navigation now-a-days. The question is always being asked: Where is there coal? There is coal in China, and that is another potentiality of the East; there is coal enough there to last at the present rate of consumption of England, 2,000 years. There is coal at Halifax, at one end of the Canadian Pacific Railway in the United States. Unfortunately the arbitration in the State of Maine put the Maine astride the line from Montreal to Halifax. This piece of Canadian territory was *alienated from Canada by the Ashburton Treaty.* The Canadians made another railway around Maine by an inter-colonial railway. There is plenty of coal and enormous resources of food on that side of the line, and it is all secure, provided you have command of the sea. Now when you get to the great lakes, you go across the rolling prairie to the Rocky Mountains, and then you come out at Vancouver, where there is coal again, the Nanaimo coalfield.

I believe the best coal for shipping is the Welsh coal, and, therefore, England has a tremendous monopoly from that point of view. But there is excellent coal at Vancouver. Another curious thing is that there is *smokeless coal* in the *Rocky Mountains, at Canmore and its vicinity.* This fact may affect the future enormously. Consequently, you have a railway which enables you to bring your troops right across the Pacific coast to the Far East, a thousand miles nearer than by any other route, which gives our nation while it has command of the sea a greater power than it had at the time of Napoleon. But you will scarcely believe that the British Government, I am not talking politics, only plain history as to several British Governments, administrators of both parties, did everything they possibly could to prevent the development of Canada through mere crass stupidity, ignorance and our habit of placing self-conceited rhetoricians with neither knowledge nor administrative ability in positions of importance for party or base social reasons. By society I mean the social plutocratic Institutions, the proceedings of its members are set forth daily with awesome admiration by even the democratic *Daily Chronicle.*

I have noted in the analysis the enormous change with regard to abolishing distance and delay effected by trans-continental railways

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and enormous and rapid steam-boats. You all know the work done by railways in the campaigns of 1866 and 1870-1, and in South Africa. But the work done by the Trans-Siberian Railways could be far surpassed by the Canadian and United States Trans-Continental railways—and I have now to thank the Canadian Pacific and Grand Trunk Railways of Canada for the large supply of excellent maps which they have so kindly enabled me to distribute among my audience.

In February, 1904, a few days after the war began, a whole division of Japanese, twice as strong as Wellington's army of Portugal in 1808, was in Chemulpo Harbour, in seventy-five vessels of 1300 to 4000 tons, about 130,000 tons in all, they had carried 17,500 regular troops, 5500 coolies, 500 horses, 36 guns and a quantity of provisions. The work of Prince Khilkoff as organiser, and in the development of the Trans-Siberian Railway was magnificent. Indeed the whole conception, scheme and operation of this enormous track is a triumph for the capacity and foresight of Russia.

In March, 1904, three trains a day traversed the line to Manchuria, on June 7, on October 9, in February, 1905, no fewer than eleven. In August, 1905, there were twelve, and in September, thirteen. Engineer officers present will understand this labour of Hercules. I cannot give exact figures of the work done, but according to "Novóie Vrémia" these figures are accurate. It carried to Harbin from the beginning of the war till the armistice:—

20,000	officers.
1,270,000	N.C.O's and privates.
230,000	horses.
1,600	guns, and
700,000	tons of material.

In fact Kuropatkin by its means was enabled to present a bold face to 400,000 victorious adversaries to the end.

I ask do we stand in as proud a position as we once stood? I fear that our recent indifference to the West Indies and the Mediterranean and the Pacific has diminished our prestige and enhanced that of Japan and the United States accordingly. It is very well indeed that Australia and Canada, therefore, are ready to take a large share in the defence of the Pacific, and are not under the influence of anti-militarist cant, and are enamoured of obligatory universal service, the only military system that ever yet enabled any country to acquit itself well in any serious international crisis.

I have here maps of the new All-Red Route and the Grand Trunk Railway of Canada linking the Atlantic to the Pacific, which may be called the top story of the transport development of the Dominion, whose food supply resources are well nigh inexhaustible, and I have also maps of the Canadian Pacific Railway as well as of various trans-continental American railways the final tunnel of the last of which from Valparaiso to Buenos Ayres was cut through the Andes not a month ago. This will unite the Chilian strip of territory, narrow and rugged, and yet full of promise with these boundless waving cornfields of the eastern slopes, and the vast pastures whose flocks feed the poor hand-to-mouth casual toilers of Glasgow and Liverpool and Whitechapel, with abundance of fresh meat on Saturday nights at three or

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four pence a pound. Such abundance and cheapness in the days of Chinese isolation and splendour did not pour down the mighty rivers which gave irrigation and fertility to the countless myriads of agriculturists between the highlands of Thibet and the Yellow Sea.

Now for the Chinese! Their enormous isolated realm their strange costumes and habits their teeming population and the amazing resources of their mighty Empire were rather a rumour than a reality to Europe till days of the all-conquering Mongolian and Central Asian hordes and of the even more adventurous traveller Marco Polo. There is no doubt that the Chinese were inclined to welcome and encourage Western navigation and settlers of the Portuguese and Spanish first, but the monstrous villany of the Portuguese and the Dutch, aided by firearms and discipline could not master the Celestials as easily as they ruined the mighty Empress of Montezuma and of the Incas. China became isolated; foreign devils were excluded. In the days of Queen Victoria the justly suspicious Chinese folk were coaxed and kicked and robbed into again opening their commerce to European civilization, but they soon began to turn the tables on their persecutors, and both Mr. Gladstone and Mr. Bancroft admitted that their treatment by Europeans had been infamous to a degree and that they have been hated for their merits more than their faults. Nothing seems to affect their health, vitality, ingenuity, industry, reproductiveness, or commercial adaptability. Bancroft proves from American records that they are the great reserve of human force and that under a system of unchecked free trade in labour and brains as in commodities they would eliminate all but the very choicest and hardest European workmen from any chance of success in temperate as well as tropical zones. But they despised soldiers. They anticipated by centuries the cant of anti-militarism men hired to kill seemed to them as contemptible as the hero of a Balaclava charge or the relief of Lucknow would to a snug village grocer or city churchwarden of the Victorian Manchester School epoch. China was for ages in advance of all mankind in Arts, the magnificence of her architecture, the vastness of her Canal, the brilliancy and exquisite textures of her looms, her ivory and silver work. An extraordinary piece of fatuity on the part of the Imperial Defence Board is their notion that the district between Aberdeen, Heligoland, the mouth of the Elbe and the mouth of the Scheldt and thence to Southampton, is our all in all. Germany is greatly our superior in all things but one—in Naval power, and only second to us in that, and perchance capable of crippling and starving us by sea before long if we don't change our methods, mental, social, and political. But she is not everything and the preposterous policy of virtually withdrawing our fleets with modern armaments from the Pacific amazed the merchants of all other lands. The very finest, as well as the deadliest inventions up to the epoch of the utilisation of steam and electricity were Chinese, but the cult of arms was neglected. All progress in the art of war was resisted though collision with Europeans have been frequent since 1840.

However, the easy victories of the Japanese in 1894-5, and the humiliation of the shameless and outrageous operations of the representatives of Europe in Pekin in 1900, and the examples of the

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results of naval and military energy and skill in 1904-5, have at last convinced them that if they are to hold their own they are to hark back up to the standard of the old Mongolian and Tartar martial enterprise. If they do and display a tithe of the energy and skill of Yenghis Khan and his successors from the twelveth to the fifteenth centuries the whole history of mankind will change and all the Pacific will be at their mercy in a generation. It must be observed that they already prosper enormously wherever they get the chance in every city in the Far East. There is no doubt that they could compel Canada and California and Australia and South Africa to admit them as fellow men with equal rights. My friend, Baron Suyematsu has proclaimed that, after most careful observation of Europeans, he has come to the conclusion that in religion, manners, ability, fair play, they are in no sense superior to the Chinese, and in many respects inferior, and missionaries and other friends of the Lecturer declare that even Korean children and women also are better off in every way than the majority of Lanarkshire or Lancashire or Dublin poor folk. When in 1900 all foreigners, were tried in the same fire, the peoples of Europe learned to their humiliation that the largest measure of restraint was exercised, not by white men, but by the soldiers of an oriental power. Be this as it may.

The Chinese have changed, within this year, contempt for military men into admiration for skill in arms, and Chinese investigators and experts of rank are now studying the methods of naval architecture in British work yards. The isolated Chinese want a fleet! I have observed that the ablest students of Weltpolitik in Germany, and not a few English scholars have viewed their adoption of European civilisation with horror. Suppose they took it into their heads to be Crusaders without even the slight Christianity of the followers of Richard and of Frederick Barbarossa and of blind old Dandolo, where would Australia and America be? Before facing the answer to that question, Americans are fortifying Honolulu at Makaliki Hill, and Australians are adopting military service, and men like Colquhoun and Bancroft make the Pacific the theme of admirable treatises, and when our fleet had retired homeward and even St. Helena was being abandoned by that preposterous Committee of Imperial Defence, the American fleet patrolled the Pacific in a more significant voyage than that of Magellan or Drake. There are seven naval powers to-day, there soon may be an eighth. In the war with Japan in 1894, China had a number of efficient and powerful ships with crews trained on modern lines, but maladministration and lack of ammunition enabled the Japanese at the Yalu and Wei Hai Wei to sweep the Chinese navy off the seas. Since then that navy has been a negligeable quantity except for policing the long coast line. The Chinese are shaking their apathy off and striving to learn from the west, not because they admire the principles and practices of European civilisation, but because they wish to obtain the strength to keep off foreign aggression and to assert their sovereign rights in the face of the world. The need of training, preparation and union, is urged in every school and newspaper and a remarkable spirit of martial enthusiasm is abroad in the land. In the past the fighting professions have been despised in China. Military and Naval officers have been

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of little account, and the lack of prestige attaching to the two services has no doubt been largely responsible for the weakness of the Empire. But the recent direct association of the Emperor and the members of his family with the army and navy cannot but give a powerful impetus to the important movement in China to-day, which aims at developing the armed strength of the Empire.

Now it is not to be supposed for a moment that Chinese or any other coloured races will stand the stigma put upon them by South Africans, Americans and Australasians, one moment more than is necessary. Hence I cannot see how their enforced isolation can be maintained except at the cost of a series of wars. Their question is why the white races want supremacy. How is it to be maintained. The answer is by force. But suppose the coloured or yellow races organise and mobilise superior force, then the supremacy of the Anglo-Saxons will be challenged, and perchance lost from Hong Kong to Auckland and Panama, and from the Cape of Good Hope to the Gulf of Carpentaria.

Thus, gentlemen, I have indicated the principal problems of the future, not one of which should be ignored by any British statesman of any party. You can work out any other that appear on the programme, but for which I have not time, by the aid of any good atlas. Whether our race will be able to hold its own depends largely on this audience, and how far the necessary conditions of success in war in regard to numbers, physical and mental power, scientific apparatus, arms, equipment, food, intelligence, training, general and professional, are provided well in advance of the dread contingency of war by the powers that be. I cannot criticise these without touching on politics. Hence, Sir Alfred Turner, and General Belfield, and ladies and gentlemen, I close this lengthy discourse by declaring that being allowed to deliver it before the Royal Artillery, which has so long won fame in the pursuit of duty in every clime and among every race, is one of the greatest honours which can be conferred on any patriot; I thank you for your patience, I salute you, Sir, and through you General every member of the Royal Artillery, of every rank, wherever serving, by land or sea—*per mare et terras.*

DISCUSSION.

THE CHAIRMAN: Would any gentleman like to make any remarks on the admirable lecture we have heard, or to ask any questions?

GENERAL BELFIELD: Sir Alfred Turner; I only rise to say a few words. I find Dr. Maguire as I knew him twenty-four years ago, still in the same vein, able to take an old subject and draw new lessons from it. I imagine it was a revelation to many people, as it was to me, to think that the Americans were guided in their policy by our action in South Africa. I am naturally not in a position to question what he says, and I have no doubt what Dr. Maguire told us is correct. The lecture to a large extent deals with the question of communica-

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tions. Throughout the world's history the question of communications has been of vital importance. The ones he generally dealt with were such possible communications as lines of railway and shipping lines, but these forms of communication can never be put to their full use until backed up by other forms of communication such as telegraphs and conveyance of news. To us soldiers it is evident that the conveyance of ideas is of great importance. We are getting better at it every day, we must go on steadily improving the means at our disposal.

THE CHAIRMAN: I am very glad to have been able to remain till the close of the meeting to thank Dr. Maguire for his able lecture. In conclusion I would make a few brief remarks as to our state of preparation for war. When peace is spread over the face of the earth people are apt to slumber and to be unconscious of the fact that war may break out at a very short notice, like lava from the crater of an apparently dormant volcano. I was in Austria last year, when important events arose with regard to Bosnia and Herzogovina, and had not Germany masterfully interfered, war would have been spread probably from one end of Europe to the other. According to rumours published in the newspapers, Japan and Russia have come to an agreement, the outcome of which is to be, that Japan may be put into a position to turn her undivided attention to the United States, with which she regards an eventual struggle for the predominance of the Pacific as a certain event of the future. At present Japan has 11 battleships, 11 large cruisers, and 58 destroyers; the United States has 25 battleships, 13 cruisers, and 25 destroyers. So that the latter has a decided predominance at sea at present. Seeing, however, what the evolution of Japan has been in the last forty years, she will certainly not stop where she is, and she must find an outlet for her ever increasing population of now 58,000,000. Australia is not without anxiety, it appears on the score of Japan. And yet with this seething international volcano, people talk of disarmament, and even say that Great Britain should set the example and that Germany would follow. No scheme of disarmament would be possible to accept, which did not involve simultaneous and general disarmament, and the idea of such can only be called utopian. Building warships gives much employment, a consideration not to be despised in these hard times; and it must be borne in mind that as we will not bear the burden of conscription, as other countries do, we must be prepared to pay far more in comparison, for our safety, than they, in other words, the premium of our national insurance must be much higher. We must accept the conditions of international equilibrium, which the present state of Europe forces upon us, and while the peace of the earth rests upon armed force, we cannot disarm. We have listened to a very interesting and instructive lecture, which has taught me some geographical facts, with which I was not previously acquainted, and I offer, on your behalf, and my own, hearty thanks to Dr. Maguire. (Applause).

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APPENDIX I.

COMPARISON OF THE ARMED STRENGTH OF THE PRINCIPAL COUNTRIES OF EUROPE.[1]

—	Area: English Square Miles.	Population.	Army on War footing.	Percentage of soldiers to Males of Military Age.
Great Britain	121,391	43,217,687	500,000	11
Austria-Hungary	240,942	45,405,267	2,580,000	56
Belgium	11,373	7,074,910	186,994	26
France	204,092	38,961,945	2,500,000	64
Denmark	15,289	2,464,770	67,448	27
Germany	208,830	56,367,178	3,000,000	53
Italy	110,646	32,475,253	1,062,467	33
Netherlands	12,648	5,509,659	69,000	13
Russia	8,644,100	143,000,000	4,600,000	32
Sweden	172,876	5,260,811	250,000	48
Spain	196,173	18,618,086	327,032	19
Switzerland	15,976	3,425,383	537,899	67
Turkey	1,576,700	39,787,640	987,900	25

[1] The figures are compiled and the estimates based on "The Statesman's Year Book," 1906.

	1801.	1906.
Population	15,000,000	43,660,000
Population fed on:—		
Wheat, home produce	14,000,000	9,386,900
Wheat, foreign produce	900,000	34,273,100

BRITISH MILITARY ESTABLISHMENTS.

1899.

Regulars (Indian Army not included) 210,000	Ordnance	£ 6,000,000
Militia 80,000	Expenditure	£21,144,000
Volunteers available, about 500,000		

For year ending March, 1910.

Regular Force, Home and Colonial, including Regular Establishment of Special Reserves	168,800
Colonial Forces	8,600
Army Reserve	137,000
Special Reserve (about 20,000 short)	90,000
Militia Reserve Division	1,650
Militia, Channel Islands	3,160
Militia, Malta and Bermuda	2,860
Territorial Force (about 50,000 short)	315,716
Officers' Training Corps	788
Regular Forces on the Indian Establishment	76,000

Cost ... £28,000,000

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COMPARATIVE EXPENDITURE.

Here are some figures which are well worth considering, as they embrace all the expenditure on new ships and their guns for the last year of the Unionist Government, for all the years of the present Liberal Government, and for next year in the case of Germany:—

Year.	Great Britain.	Germany.
1905-6	£11,369,000	£ 4,969,000
1906-7	£10,486,000	£ 5,342,000
1907-8	£ 9,166,000	£ 6,285,000
1908-9	£ 8,660,000	£ 8,366,000
1909-10	£10,256,000	£10,751,000
1910-11	—	£12,177,500

APPENDIX II.

The following table of distances will be useful for reference:—

	Miles.
Vancouver to Montreal	2,906
Vancouver to New York, *viâ* Brockville	3,163
Vancouver to Boston, *viâ* Montreal	3,248
Vancouver to Liverpool, *viâ* Montreal	5,713
San Francisco to New York	3,266
San Francisco to Boston	3,370
Yokohama, Japan to Liverpool, *viâ* San Francisco	11,281
Yokohama, Japan to Liverpool, *viâ* Vancouver	10,047
Sydney to Liverpool, *viâ* Vancouver	12,657
Sydney to Liverpool, *viâ* San Francisco	13,032
Liverpool to Hong Kong, *viâ* Vancouver	11,649
Liverpool to Hong Kong, *viâ* San Francisco	12,883
Vancouver to Yokohama	4,283
Vancouver to Hong Kong	5,936
Vancouver to Calcutta	8,987
Vancouver to London, *viâ* Suez Canal	15,735
Vancouver to Suva, Fiji	5,215
Vancouver to Honolulu, H.I.	2,410
Vancouver to Sydney, N.S.W.	6,960

In these and similar matters I got much help and most liberal supplies of matter from the agents of the Canadian-Pacific Railway and the Grand Trunk Railway.

THE NEW PACIFIC: LINES OF COMMUNICATION.

Bancroft says:—

A dozen lines of steamships, or thereabout, now (in 1900) cross the Pacific between America and Asia, where, for two and a half centuries, a single galleon made its clumsy way forth and back from Acapulco to Manila once a year. Ships comprising scores of lines ply along the shore, unite the islands and mainland, or sail direct for foreign ports. Thus Hawaii and California are linked, Australia with Asia and America and all the larger islands; North America with

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South America, Africa, and Europe; Japan and China with Southern Asia, the Philippines, Australia, India, and Europe; Alaska and Pacific ports, Mexico and Pacific ports, Central and South America, while the shores, islands and rivers of Asia swarm with foreign vessels where, half a century ago, a timid commerce found for the most part sealed ports. Sixty years ago vessels trading into the Pacific rounded Cape Horn or Good Hope, and, creeping along the coasts of America or Asia, called at the various points for traffic and made their exchanges, returning after an absence of one or two years. Now all the important ports have their fast-running steam-ships, sailing on stated days, direct to, or connected with, the chief cities in the world. At such places as Vladivostok, Yokohama, Tientsin, Shanghai, and Hong Kong twenty-five or fifty steamers of the Pacific mail, the Canada Pacific, the Northern Pacific, the Oriental and California, the Oriental and Peninsula, the Trans-Siberian, and the Nipon Yusen Kaisha, or Japan Mail Steamship Company, may any day be seen at anchor, or arriving and departing, the last-named company alone, the largest but one in the world, operating hundreds of vessels, including eighty-three steamers, and entering every commercial port of Japan, China, Korea, and Siberia, with lines to Calcutta, the Philippines, Australia, the Hawaiian Islands, and America. Then, besides the swarms of native junks and river steamboats and fleets of sail, are thousands of foreign sailing vessels which likewise cross and recross from every point to every point, or pass along the shore, carrying the surplus products of one land to another to benefit all first appearing within the last half century. Back of this was the time when small craft of forty and sixty tons—seldom larger than three or four hundred tons—sailed this sea on voyages of circumnavigation and discovery, sometimes of piracy or of pure adventure, sometimes of all together, now stealing stealthily along the shore with bloody-handed cut-throat crew, rifling towns and burning ships, or striking out boldly into the unknown with a recklessness unsurpassed by the mariners of any age or nation.

To-day, the iron-bound battleship ploughs her majestic course with ponderous implements of destruction so nicely poised as to make the leviathan arbiter of human destinies alike on sea and land; one or more of these modern monsters being served on their way and at their destination by coal ships, supply ships, refrigerator ships, and distilling and repair vessels, so that every comfort and every advantage may be at hand for those who go forth to death or domination. With the application to navigation of electrical, or some yet-to-be-discovered power, the voyage across the Pacific will occupy no more time than is now required in crossing the Atlantic.

APPENDIX III.

POSITION OF JAPAN.

The geographical position of Japan is even more important from a military and naval point of view than it is from a commercial and industrial one, and no doubt the statesmen of the world will not be slow to recognise this fact, now that Japan has shown her ability to win battles both by land and by sea. The geographical position,

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therefore, formed a very important factor in securing for Japan the recognition among the nations of the world which was her due. This importance was distinctly shown in the war with Russia. The long line of the Japanese Empire, from Saghalien to Formosa, affords safe and convenient stations for both military and naval purposes; and in any conflict the army and navy would be near their sources of supply, and not thousands of miles away, as would be the case with the European and American Powers. The coasts of China would thus be commanded and the passage of any hostile forces made very difficult. Korea is within a few hours sail of some of the strongest and most complete and convenient ports of Japan, and these are connected by railway and telegraph to all the chief military and naval centres in the Empire. Hong Kong is close to the southern part of Formosa, the Philippines are less than seven days steaming from Nagasaki, while Indo-China, Siam, and even Australia, are all within comparatively easy reach. The whole coast line of the American continent, both North and South, is within striking distance of the Japanese navy. It is, therefore, evident that Japan, by herself, must be a very potent factor in all Far Eastern international questions.

From "Japan in World Politics." Henry Dyer.

APPENDIX IV.

PANAMA CANAL.

The completion of the Panama Canal will have a profound effect on the commerce, not only of Japan and China, but also of that of the other countries and colonies in the Pacific area. From New York to Hong Kong *viâ* Panama will be almost as short as from London to Hong Kong *viâ* Suez; and New York will be brought nearer to Japan by the new route than London is by the present route. Thus the Canal will have the effect of placing the industrial part of the United States (the north-east) on an equality with Britain in regard to the distance from the markets of the Far East. This for certain classes of goods, should cause a considerable impetus to the trade by the Trans-Siberian Railway, which now makes communication between London and Japan possible in about fourteen days. From British ports to New Zealand the Panama route is about 1300 miles shorter than the Suez route and 3000 miles shorter than the Cape route; but for Australia, China, and Japan, the Suez route will still be short from Europe. The Canal will bring the Pacific ports of both North and South America into closer connection with the Atlantic and Gulf ports and with Europe. From Liverpool the saving will be over 6000 miles. The canal will be of great naval importance to the United States by enabling it to concentrate its fleets in either ocean.

From "Japan in World Politics." Henry Dyer.

APPENDIX V.

JAPAN'S BUSHIDO.

Its ardour, even fanaticism for the profession of arms, was always displayed even in the exercises of peace. These sentiments were

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manifested in night marches where the greater the difficulties the greater the pleasure in overcoming them.

In 1882 the Mikado addressed to his army a proclamation of which a portion is here given:—

"All those who serve in the army ought to regard as their first duty *fidelity to their country* . . . . without patriotism, however well versed in the arts and sciences, soldiers would be only puppets. If they are not faithful, troops, even well organised, resemble at the moment of action flights of birds. Do not allow yourselves to be carried away by public opinion and do not mix yourselves up in political questions; practice only fidelity to country, which is your first duty, remembering that *duty is heavier than the mountains* and that *death is lighter than a feather*." . . . . "In the second place a soldier should rigorously observe *discipline*. Except in cases where the exigencies of service demand the exercise of authority, all will endeavour to treat one another with deference and kindness, so that officers and soldiers may be united in the cause of their Sovereign. Every member of the army who, forgetting discipline, destroys that union, either by a want of respect for his chiefs, or by an absence of kindness to his inferiors, would only be a poison for the army and a criminal in the eye of the nation." . . . . "The third virtue is *courage*. If in all time this virtue has been held in such honour in our Empire that not one of our subjects has been able to live without it, how then shall soldiers, whose mission it is to measure themselves with the enemy on the field of battle, how can they forget even for an instant that they ought to possess it. But there are two degrees in this virtue; *small courage* and *great courage* (rashness and bravery). One could not in fact call brave a man with an ardent and turbulent temperament. A soldier should always act with reflection, watch over his character and well weigh all his acts. Do his duty without despising his enemy however weak, without fearing him however strong; such is real courage. . . . . A soldier who on every occasion loves to make a parade of his strength, winds up by being detested by the people and regarded as a wolf." . . . . "In the fourth place soldiers should *observe* scrupulously all *honour and respect* for *their sworn word* . . . . Without these virtues, a soldier cannot remain a single day in the ranks of the army."

In the late war, though the Chinese were evidently enemies little to be feared by the Japanese, the latter, as we know, had many occasions for the display of their high military qualities. It has been stated that several officers voluntarily killed themselves, because they believed they had not sufficiently well done their duty. One notable case was that of an officer who was hindered by indisposition from being present at the engagements which preceded the taking of Port Arthur, and who died by his own hand as being dishonoured.

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To Her Majesty Alexandra, Queen Mother,
Buckingham Palace.

ENGLEMERE,
ASCOT, BERKS.

May it please Your Majesty,

On behalf of, and in common with, the Officers, Non-commissioned Officers and men of the Royal Regiment of Artillery, I beg to offer to Your Majesty, with our humble duty, our heartfelt condolence on the great loss Your Majesty, The Empire, and the Regiment have sustained in the death of our revered Colonel-in-Chief, King Edward VII; and to express to Your Majesty the deep grief and sympathy felt by all ranks of the Regiment for Your Majesty, in Your Majesty's private sorrow.

ROBERTS, F.M.,
Colonel Commandant & Master Gunner, R.A.

The above letter of condolence was submitted in the name of the whole Regiment to Her Majesty Queen Alexandra, on the lamented death of His Majesty King Edward, Colonel-in-Chief of the Regiment, by Field Marshal Earl Roberts, V.C., the Senior Artillery Officer on the active list.

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His Majesty King George V.

Lord Roberts, in answer to the letter given below, has received the following gracious reply from His Majesty King George, expressing his intention of conferring the highest honor on the Regiment by becoming its Colonel-in-Chief:—

"I greatly appreciate the wish expressed by you "on behalf of the Officers, Non-commissioned Officers "and men of the Royal Regiment of Artillery, that I "should succeed my beloved Father as your Colonel-in-"Chief, and I shall have much pleasure in occupying "that position."

Believe me,

Very Sincerely Yours,

(Signed) George, R.I.

Englemere,

Ascot, Berks.

24th May, 1910.

F.M. Lord Roberts presents his humble duty to Your Majesty, and has the honour, on behalf of the Officers, Non-commissioned Officers and men of the Royal Regiment of Artillery, to express the earnest hope of all ranks that Your Majesty will be graciously pleased to succeed Your Majesty's beloved Father—our late lamented King—as our Colonel-in-Chief.

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Issued with the "Journal of the Royal Artillery," Vol. XXXVII., No. 3. [To face page 91.

MURAT.

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NAPOLEON'S MARSHALS.

XI. MURAT.

EX UNGUE LEONEM.

By MAJOR H. M. DAVSON, R.H.A.

MURAT, the beau sabreur of the imperial armies, the most romantic figure amongst the many heroes of the Napoleonic campaigns, appeals more to the imagination and sentiment than to the admiration of the student of war. Tall, handsome, of unsurpassed courage, and affable manners, he awoke enthusiasm in his followers as well as respect in those whom he was called upon to rule; he was probably the greatest cavalry leader in history, one upon whom Fortune showered all her favours, and who left a name, that nearly a hundred years after his death, is still a household word in half the nations of Europe.

Yet his life was a tragedy. It may almost be said of it, that the latter part would form the foundation of a problem play. And this was brought about by a weakness of character in private life, which shows up the Murat in times of peace as a different being from the Murat in time of war. "He was a Paladin, a Don Quixote in the field," said Napoleon in after years. "But take him into the cabinet, he was a poltroon without judgment or decision." [1]

His life was a full one; much fuller than those of his brother marshals; and to give a short sketch of his career, bringing forward all his warlike actions, diplomatic intrigues, and general characteristics, is almost an impossibility.

Early days:—

Joachim Murat was born in the village of La-Bastide-Fortunière (now called La-Bastide-Murat), in the province of Lot, on March 25th, 1767. His father, Pierre Murat, came from an old, but obscure, family, and at this time combined the occupations of an innkeeper and small farmer. Raised in this household, the boy Joachim interested himself in looking after the horses of such travellers as stopped at the inn, until the time when he was sent to study at Cahors and Toulouse, with a view to his ultimately entering the church. He appears to have made a good impression on his masters, who have left it on record that he was of "a lovable disposition, but wholly ignorant." The restraint of school was, however, not to his liking, and produced certain disagreements with the said tutors, so, upset by this, and no doubt inwardly longing for a life more suited to him, he

[1] **O'Meara. "A Voice from St. Helena."**

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suddenly escaped from the seminary, and enlisted (28th February, 1787) in the Chasseurs of the Ardennes, who were then halted in Toulouse on the march between Auch and Carcassone.

His high spirits and keenness soon gained for him the rank of Quartermaster, but then his disposition, as formerly in the school brought him into such trouble with his superiors, that he deserted and returned to La-Bastide, when his parents induced him to take service in a haberdasher's shop in St. Céré.

His life in the shop suited the future Grand Master of Cavalry still less than his life in the seminary, and it was with joy that he heard that the canton of Montfaucon had chosen him to represent it in the Garde National at the Fête of the Federation, 14th September, 1790, a post which took him to Paris and introduced him to Life. In February, 1792, he was appointed to the Garde Constitutional, the force granted to the King by the legislative assembly.

In this corps Murat appears to have been out of his element, and he soon left it. Being, however, used to doing things in an ostentatious manner, he gave importance to his departure by accusing his colonel of illegally enlisting men from the corps to serve with the armies on the frontiers. After some acrimonious discussion, the matter was allowed to fizzle out, and Murat rejoined his old regiment (now the XIIth Chasseurs à Cheval) at Toul, when he regained his former rank.

1793:—

It was about this time that Murat first began to feel his way. His handsome figure, frank manner, and decisive mode of speech, had made him a conspicuous individual amongst the guards of the capital. Now he began to gain that confidence in himself, which was first to make him, and then to be his ruin. That a man in his position should have been able to bring an accusation, which he failed to substantiate, against his commanding officer, and to get off scot-free; that he should have been able to return to his old regiment, which he had left under a cloud, and be re-instated in his former grade, were events that were bound to leave a mark on such a character, and assist in shaping its future course.

The indication of future glory was intensified in November, when he was created sub-lieutenant, and again when he was promoted lieutenant only a fortnight later. In the following March, he was made brevet-captain and A.D.C. to General Urré de Molans. Murat having now got his foot on the ladder, began to cast about for some means whereby he could bring himself still more before the public eye. With this object he adopted ultra-republican ideas, which he vented whenever possible, and also took to writing bombastic letters about them to those whom he thought might be able to help him. It is possible that this did assist, as, on the 1st May, he was appointed *chef d'escadron* to the Hussards Braconniers, a crowd of ruffians raised by one Landrieux, which might have been supposed to fulfil the functions of advanced cavalry, had such a thing been known to those armies. With this array Murat gained a success over the Austrians at Pont-à-Mareg, but then his appointment came to an abrupt end. Landrieux had raised the corps because he wanted money. Murat

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had joined it because he wished for personal glory. Naturally the two fell out. Landrieux accused Murat of being an aristocrat, but the latter cleared himself, said his name was Marat, end even assumed it, whilst he brought counter-charges against Landrieux who was thrown into prison. At the fall of the real Marat and the Terrorists, Landrieux had his revenge, and Murat, or Marat, was arrested and confined at Amiens. An able defence at his trial enabled him once more to extricate himself, and he was permitted to rejoin his regiment at Paris.

Italy, 1796:—

It is a relief to turn from the petty squabbles of "poacher" companies to the business of real warfare, for it was at this time that fate offered Murat his chance in life, and he took it. From now forward he advanced by leaps and bounds in that remarkable career, which had no set back until the Emperor's fall, and his own death.

On the 13th, Vendemiaire, with 300 horsemen, he seized the artillery park at Chablons, thus earning the gratitude of Bonaparte who caused him to be promoted to the rank of Lieut.-Colonel and took him to Italy as his aide-de-camp. He was present at the operations up to the battle of Mondovi, and then was sent to treat with Collis about the suspension of arms; after which he returned to Paris with the text of the convention. It was at this time that he made the acquaintance of Mme. Tallien and Josephine, and—it was said by their intervention—that he was promoted General of Division by the Directory.

On the 10th May, he returned to the army, and, on the 30th was present at the passage of the Mincio, where "notre cavalerie commandée par le général Murat fit des prodiges de valeur."[1] Murat appears to have behaved with great gallantry, and indeed with his own hands, rescued several men who had been captured, but at the same time there is no doubt that the success of the cavalry action was due to Kilmaine's handling, and not to him.

In July he failed in an attack on Mantua. He said the river was too full and the boats could not cross. Possibly such was the case, or else Murat was not himself, for he succumbed to an attack of fever a few days afterwards, and went to Brescia to recover, where he had the misfortune to be captured by the enemy. After a short time he was exchanged, and was given command of a mobile column to punish the inhabitants of Casal Maggiore. He then became Governor of Padua.

He rejoined the army in September, replacing Dubois in command of the army of the Tyrol, and took part in the battle of Bassano, and the combat of St. George, where we find, for the only time in his career, he showed a want of physical courage. Miollis, with an inferior force, was engaged in checking the sorties from Mantua. "In one of these Murat at the head of a feeble detachment was "ordered to charge Wurmser's columns. He was afraid, neglected "to execute the order, and in the first moment of confusion said he "was wounded."[2]

[1] Bonaparte's Despatches.

[2] Bourienne's Memoirs. As a matter of fact Murat was really wounded.

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After this he fell out with Napoleon. It was probably on account of this lapse, although some writers have ascribed it to the fact that the First Consul had received news of an undue intimacy between Murat and Josephine in Paris. Whatever was the reason, Murat was detached from the army during the operations round Arcola, and was not mentioned in any despatch. He was still so detached when the battle of Rivoli took place, but his behaviour on this occasion went far to restore him to Bonaparte's favour. For, being at Salo on the other side of the Lake of Garda, he, with a battalion of light infantry, crossed the lake in a barque, marched all night, and at day-break on the 15th appeared on the heights of La Corona, thereby taking the retreating Alvinzi in flank and assisting Joubert to complete his rout.

On the 16th March, he was transferred to Bernadotte's division and helped to force the passage of the Tagliamento; and a subsequent rapid advance to the Isonzo, gained for him the praise of Bonaparte for his handling of the advanced guard.

On his return to headquarters, he met Caroline Bonaparte, who was at that time stopping with the rest of her family at the chateau of Montebello. Caroline was at that time a tall attractive girl of fifteen, whose charms made an immediate impression on her brother's brilliant aide-de-camp; whilst she, on her side, was at least flattered by the attentions paid to her by this dashing young officer, who was already considered the bravest man in the army. Other work, however, claimed Murat at the moment. He was sent into the Valtelline on a diplomatic mission in which he displayed a skill worthy of a lawyer, and the result apparently ended the temporary disfavour with which the First Consul had regarded him.

Being sent to Rome on the death of Duphot, he received from Dallemagne, command of a column to repress the rising of the neighbouring peasants. This duty Murat carried out with such ability and energy that he earned the ungrudging praise not only of Dallemagne,[1] but of Masséna himself. It is apparent that this quondam stable-boy was quickly learning the art of war. The working of this column, comparatively small and unimportant as it was, shows a perfect understanding of the rules of "time and space," and also of the handling of cavalry and light infantry. But there, all that Murat ever did may be said to have begun and ended. The quickness and resource which he showed on this early occasion, remained with him to the last; the ability to guide the greater destinies of warfare never reached him at all. The campaign of Italy may be taken as a dim prelude of his career. It brought out high qualities and great defects, and it developed a character, which, in after life was to accentuate both of these.

Egypt and Syria, 1798-9:—

Bonaparte did not at first choose Murat to accompany him on his Eastern expedition. Possibly some memories of the recent dissatisfaction still remained, for it was not until some time after the army had been formed that Murat received orders to join. Even then,

[1] **A distinguished general at this time. He was sent to the Rhine after the Peace of Campo Formio, but retired sick, and disappeared from military life until 1809, when he commanded a division in Holland. He died in 1813.**

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owing to fears of a European war, these orders were countermanded, and it was only when the fleet had reached Malta, that he took his place with the army. At this time also, judging from Murat's letters to Barras, the first consul was far from friendly to him, and, not knowing that he was marching on the high road to fame, he more than once showed regret that he had exchanged the beauties and interests of France for the sands and hardships of Egypt.

After the battle of the Pyramids, he became Governor of the province of Keliub, to the north of Cairo, where he employed his time in re-horsing the cavalry and repressing rebellion. In carrying out this duty, one act of his towards the end of September was especially remarkable, when with equal courage and skill, and with a greatly inferior force, he attacked an insurgent band across a series of broken canals and utterly routed it.

He commanded the cavalry during the Syrian expedition, gave a striking example of good leading of mounted troops at Gaza, and during the siege of Acre, covered the army from the landward side. His work here was very good, and included some operations in the valley of the Jordan, when he checked the immensely superior forces of the Pacha of Dama at the Lake of Tiberias.

On the return to Egypt, the Mamelukes and Murad Bey descended the Nile. Murat then fought a brilliant delaying action against Murad, which allowed Bonaparte to defeat that leader near the Pyramids. Then came the news of the landing near Aboukir and all hurried northwards.

The battle of Aboukir was the most glorious action in which, up to that time, Murat had taken part. It was fought on a peninsula. The Turkish army drawn up across it, had left a space on their right between their first line and the sea. Into this space Murat penetrated with his cavalry, and, whilst Lannes and Destaing attacked in front, he executed repeated charges, killing 1400 of the enemy, taking 1200 prisoners, and driving about 5000 into the sea. The Turkish second line was, however, unshaken, and they held on to a redoubt in their centre, and some fortifications between that and the sea on their right. Murat, learning that their left flank was *en l'air*, swung his cavalry round the army and charged it. He then found himself caught between the fire of the redoubt and that of the Turkish gunboats on the Lake of Maadieh, and for some time endured severe loss. Lannes now penetrated to the redoubt and attacked it; and then Murat, severely wounded as he was, rallied his suffering squadrons and, executing one of those brilliant charges which have made his name so famous, practically ended the conflict. "Le gain de la bataille," wrote Bonaparte, "Qui aura tant d'influence sur la gloire de la république, est dû principalement au général Murat. Je vous demande pour ce général le grade de général de division. *Sa brigade de cavalerie a fait l'impossible.*"[1]

After this eulogy, it was but natural that Bonaparte should take his cavalry leader back with him to France. And he well repaid the act, for, on the 18th, Brumaire, during the time of crisis, when the irresolution of Bonaparte himself was likely to make for failure,

[1] **Murat's letter to his father made no mention of his brilliant conduct, and only said his wound had not spoilt his beauty (!).**

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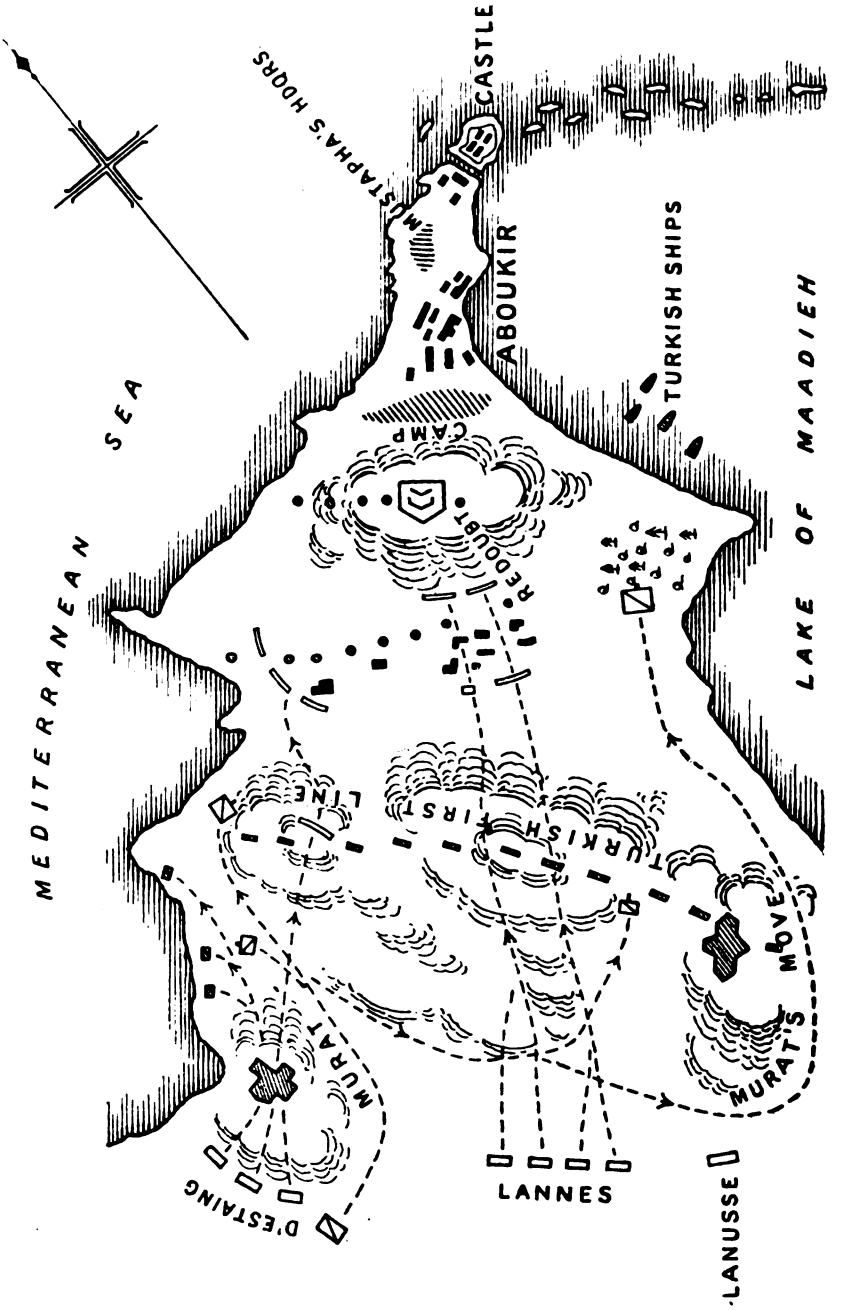

Murat's decisive action in chasing the deputies from the Orangerie saved the situation. On the 19th, in the midst of the turmoil, he found time to gallop to Mme. Campan's school to carry the news to Caroline Bonaparte, whom he had met again in Paris a few days

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before these events, when he had renewed his suit. It did not find much favour with the first consul, however, who would have preferred Moreau for a brother-in-law. But that general had no liking for the arrangement, and Bonaparte was compelled to agree to the marriage, the civil portion of which took place at Plailly on the 20th January.[1]

According to the memoirs of such writers as the Duchess of Abrantès and Mme. de Remusat, Caroline was at this time a strikingly beautiful woman. Yet neither of these ladies foresaw in the lively girl the future development which was to exercise such a baleful influence upon her husband, and to end by materially assisting to drag even her brother from his throne.

1800-4. Italy, &c.:—

In the campaign of 1800, Murat received command of the "cavalry of the reserve." He confined himself to manœuvring the light cavalry, leaving the chasseurs to Champeau and the heavy regiments to Kellerman. Following Lannes over the St. Bernard at the head of 6000 men, he advanced to Vercella where he overthrew a detachment of the enemy, occupied Santhia and pursued in the direction of Milan. He fought at Novara on the 29th May, and forced the Ticino—a skilful action which he himself conducted—and then entered the capital. In accordance with Bonaparte's wish to command both banks of the Po, he moved on to Lodi and captured Piacenza, returning to headquarters on the arrival of Desaix.

At the battle of Marengo he was commander of all the cavalry, but they acted independently and though Murat displayed great activity and was much exposed, no action of note is recorded of him. The glory of the day belonged to Kellerman. At the close of the operations he returned to Paris with Bonaparte, and on June 23rd, was presented with a sword of honour by the consuls.

Murat then commanded a division at Amiens—an appointment which he owed to his wife—and in November, by some clever tactics, he managed to get himself appointed to the command of the Corps of Observation at Dijon in place of Bernadotte, who had originally been nominated for the post. He moved to Milan in December by the Little St. Bernard,[2] and having arrived there, conceived the idea of ousting Brune from his command. To gain this end he once more brought his wife's influence to bear on the first consul, but got severely snubbed for his pains. He was then sent to Ancona, which he annexed, and then to Florence where he engaged in diplomatic ventures against the court of Naples. Murat took a great deal of trouble over this intrigue, and, having brought it to a satisfactory conclusion, got himself nominated as Commander-in-Chief of the army of Italy —a most successful enterprise which brought even Soult under his command.[3] He then employed himself with the capture of Elba, which, after some failures, was conquered for him by Watrin.[4]

He was then joined by his wife. It is necessary to speak more of her in writing a sketch of Murat's life than is the case with the

[1] The religious ceremony took place after the wedding of Louis and Hortense Beauharnais in January, 1802.
[2] It was at this time that Macdonald crossed the Splügen.
[3] Soult, page 203.
[4] Commanded a brigade under Lannes; distinguished at Montebello.

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wives of the other marshals; for she exercised so great an influence on the career of her husband that, in case no reference were made to her, many of his actions might be considered incomprehensible. Later, his command was increased by the attachment of certain troops in the Cis-Alpine Republic, and then Murat appears to have become satisfied with his success, for he repaired with Caroline to Paris, where he spent most of his savings in buying houses, and took the opportunity of having his marriage celebrated according to the rites of the church.

He returned to Milan in February, 1802, but was soon again in Paris, being accused of receiving bribes for offices. He cleared himself of this charge and returned to Italy to finish his time of command, which he brought to a conclusion with a violent quarrel with St. Cyr.

Once more in the capital he proceeded to enjoy life at the Hôtel Thelluson until he found himself implicated in the murder of the Duc D'Enghien. In this matter Murat was undoubtedly free from all blame. It is even recorded of him that he went to his brother-in-law to protest against the outrage. For Murat, vain, conceited, quarrelsome, and ofttimes unscrupulous as to how he gained his ends, was a humane man, and such intrigues were contrary to his nature. On the 19th May he was created marshal, and in the following February, Grand Admiral and Senator, and then was made a Prince.

The Danube, 1805:—

When Napoleon decided upon the campaign of Ulm, he sent Murat, in August, to study the route *viâ* Wurzburg, to the Danube and the frontier of Bohemia. He carried out this duty in a satisfactory manner and returned to Paris on the 10th September. During his absence he had been appointed to the Corps of Observation on the Rhine, and now, from his headquarters at Strassburg, he kept the Emperor well informed of all that was passing on the other side. He now formed his command into the famous "Screen in the Black Forest," perhaps the most notable example of strategic concealment known to history. He masked the Emperor's designs whilst his six army corps passed round and lined the banks of the Danube.

After the departure of Lannes and Ney northward, Murat kept his headquarters at Kehl, having before him, disposed in a semi-circle, the three first divisions of dragoons and the cuirassiers of Hautpoul. More to the south was the 4th division of dragoons, which masked the remainder of the cavalry when they withdrew *viâ* Rastadt, Ettlingen and Pforzheim in the direction of Stüttgart.

Having protected the march, the cavalry then crossed the river and cleared the way to Munich. Then came the action of Wertigen, which may be described as one of Murat's best and reads like a fight of the middle ages. On the 10th October, the marshal was given command of the left wing, when he made that almost fatal mistake which caused Ney to fight the bloody battle of Elchingen, and drew fierce protests both from that marshal and Lannes, and also the judicious advice "Venez prince, venez faire vos plans sur le terrain." In the subsequent pursuit after the Archduke Ferdinand and Werneck, Murat was himself again. Between the 16th and 20th October, his cavalry covered 140 miles, not including the extra work done by

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detachments and flanking squadrons, and he finished by annihilating Werneck at Nerestetten, where he captured 3000 prisoners, and chased the remainder towards Bohemia; causing much damage and covering 100 miles in five days, during the last 80 of which he fought all the way.[1]

After the fall of Ulm, he followed the Austrians and fought actions at Ried, Seding, the passage of the Traun and Amstetten. Then, instead of following Kutusoff over the Danube and supporting the corps of Mortier, he rushed madly on Vienna. The result was the loss at Dürrenstein and the wrath of Napoleon. Murat said that he mistook his orders, but it is scarcely believable that a cavalry leader of his calibre could have been ignorant of what the circumstances required, and it is more probable that he hankered after a second "entry into Milan," and risked the Emperor's plans to gain a temporary, personal triumph. He did enter Vienna first, and on the 13th November seized the bridge of Thabor. This was mostly Lannes' work, but after the success of the enterprise, Napoleon forgave Murat for his previous error.[2] He then pursued the Austrians to Hollabrun, where he allowed himself to be tricked into an armistice which nearly gave the enemy time to escape. He commanded the left at Austerlitz. His personal deeds were not of note, except that at one time, being isolated, he cut his way through a regiment of Russian dragoons which he had mistaken for Bavarians.

On the 15th March, 1806, he was created Grand Duke of Berg and Cleves, which places had been yielded to the Emperor after Austerlitz. Napoleon had wished to grant these domains to someone subject to him for the purpose of balancing Prussian power on the Lower Rhine, and Murat and Caroline intrigued with Talleyrand for their possession. The emperor acquiesced but stipulated that his brother-in-law should use his christian name and not that of Murat; an arrangement meant to show that the new Duke was his relation and not the cavalry leader.[3]

Prussia, 1806-7:—

On the 25th March, Murat entered into his duchy. It was a species of Roman triumph. His clothes were dazzling in their magnificance, and the populace, either from choice or from suggestion, received him with acclamation. Murat now, filled with conceit at being a reigning Prince, set to work to aggrandize himself and to fall out with his neighbours, a policy which was to bear bitter fruit in years to come. He was called from his Duchy to take part in the campaign of 1806—a war which had been materially helped on by his bearing with Blücher and the Prussian authorities. Many Prussians must, however, have regretted that their annoyance drew Murat from a peaceful, if aggressive, reign to undertake a still more offensive warfare. Leaving his Duchy to be defended by Louis Bonaparte, he rendezvoused at Frankfort towards the end of September, and then set out for Wurzburg. The Grand Duke of Berg then once again became the Marshal Murat. He put Wurzburg in a state of defence and moved on Kronach; forced the Saale at Saalberg; next

[1] **Murat's captures were great, but the 10th bulletin exaggerates them.**
[2] c/f Lannes, Prince Auersperg got ten years imprisonment for his mistake.
[3] c f Mm. Chavannon and St. Yves.

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day conquered at Schleitz and advanced towards Leipzig. After this he made a forty-five mile march to Jena and took part in the battle.

Then followed the most brilliant series of actions of the Marshal's career, and the greatest cavalry pursuit that has ever been known. Murat followed the beaten Prussians and reached Weimar at 6 p.m. Next day, the 15th, he flung Lasalle and Milhaud on Erfurt where they overthrew a rearguard 10,000 strong, took the town, and captured 14,000 men, including the Prince of Orange, Marshal Moellendorf, and 120 guns. That evening Lasalle reached Tennstedt, and Klein arrived at Weissensee. On the 18th, Milhaud beat Hohenlohe's rear-guard at Hasselfeld, and again next day at Halberstadt. On the day following Murat himself reached Magdeburg, which town he observed, and crossing the Elbe at Dessau, sent Lasalle on to Spandau. On the 25th this General left Charlottenburg in pursuit of Hohenlohe, whom he and Grouchy defeated next day at Zehdenick, whilst on the 27th and 28th, the Marshal carried the bulk of his forces forward by a forced march, and again tried to cut off Blücher, but the latter brushed aside Milhaud and reached Prentzlow, to which place Murat and Lasalle followed him Here on the arrival of Lannes, he was compelled to surrender, giving up Prince Auguste of Prussia, 14,000 infantry, 2,000 cavalry, and 64 guns. On the 29th Milhaud captured some cavalry which had so far escaped, at Pasewalk; and Lasalle with his light cavalry captured Stettin, an exploit which drew from Napoleon a letter saying, " My brother, I compliment you on the capture of Stettin. If our light cavalry can "capture strong towns like this, I may as well disband my engineers " and melt my cannon."

Murat then turned his attention to Blücher who had been separated from the other, and moved after him at the rate of thirty-five miles a day in the direction of Stralsund. On the 4th November, he was joined by Bernadotte at Schwerin, and Blücher threw himself into Lubeck, having had his rear-guard much hurt by Lasalle at Ratzeburg. On the 6th, Murat, Bernadotte and Soult, fought an action at Lubeck in which they lost 1500 men, but captured Blücher and his whole force—and the King of Prussia had no more an army. The Grand Master of Cavalry then wrote to his Emperor, " Sire, le combat finit " faute de combatants. Le corps de cavalerie va se mettre en marche " pour rallier a la Grande Armée à Berlin." This he did on the 11th, whilst Lannes and Davout occupied the line of the Vistula. After a week's rest, Murat set out to take up once more his position at the head of the army.

The campaign of 1806 is the greatest example of Murat's energy, endurance and power, of carrying on troops in spite of fatigue. It is also the high-water mark of his career. For never again did he display such a combination of vigour and foresight, valour and discretion as in the pursuit after Jena. In after years they all showed themselves in turn, but the combination was lacking.

He entered Warsaw in triumph—wonderfully clad—amidst the enthusiasm of the inhabitants. He had hopes that he might be the future King of Poland, and his dress was befitting the occasion. "A " rich, gold embroidered tunic, covered with a pelisse of fur; white " breeches; red leather boots; an ancient sword with a jewelled hilt

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" supported by a rich crossbelt; a sable busby with a red crown, " dressed with black ostrich feathers, and having a white aigret in the " middle fixed by a diamond brooch. In addition he had a gold- " mounted bridle, gold stirrups and a tigerskin on his saddle."[1]

Poland, 1807:—

His dreams of becoming King had, however, to be put aside for the moment. Napoleon received his hints coldly, and the Russians were active on the other side of the Vistula, which was half blocked by drifting ice, whilst snow lay deep on the ground. On the 2nd December, Murat ordered Morand's division to cross.[2] He fell ill himself, but continued in the field, and a sharp action at Lapaczyn, whence he charged at the head of some squadrons, appears to have restored him to health. In January, Prince Poniatowski gave him the sword of Stephen Bathori, which Murat with superstitious pride regarded as a presage of the sceptre.[3] When Bennigsen pushed back Bernadotte, he moved to Wellemberg so as to cut off his retreat, and when the Emperor's plan was discovered and the Russian general retired, Murat pursued him, fought at Passenheim, Allenstein, Bergfriede, &c., and so on every day to Hof and Eylau.

In the great battle of the 14th February, when Augereau's corps had been destroyed, Murat, by the Emperor's order, made that magnificent charge which is such a feature of the day. He had 3000 chasseurs and hussars in the first line, 7000 dragoons in the second, 1600 cuirassiers in the third, and with this array he practically charged the whole Russian army. The first and second lines of the enemy were broken by a deluge of men, but the third stood firm which gave other corps time to close in, and Murat's squadrons only got clear owing to the timely arrival of Bessières with the Chasseurs of the Guard and Dahlmann with his Mamelukes.[4]

After the battle Murat pursued gently to Königsberg, until Napoleon made his retrograde movement. In June, he crossed the Passarge and broke up Bagration's rear-guard, and then the Russians retreated to Heilsberg, which Murat attacked without orders, and without waiting for Davout's turning movement to develop. The result was a bloody fight in which the Grand Duke of Berg had his horse killed under him, and in which he once rescued Lasalle from certain death and was once rescued by him from the same fate. It was an unnecessary expenditure of men, and as such called forth the Emperor's wrath. He then commanded the left wing of the army, namely the commands of Davout and Soult and the cuirassiers. He was not at Friedland—it has been suggested that Napoleon did not want him there—but he pursued the Russian army to the Niemen. The Emperor then granted him a Polish guard of honour of one hundred men, which made him once again think that he was the chosen King, but Napoleon afterwards rescinded the order, and when

[1] Murat is depicted in this dress in M. Flameng's famous picture of Eylau in the gallery of the Luxemberg.

[2] This division belonged to Davout.

[3] King of Poland, 1575–86.

[4] Murat lost 3275 men, including Generals Hautpoul and Corbineau and Colonel Dahlmann.

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at Tilsitt, Murat appeared in a gorgeous Polish kit, the Emperor altogether upset his hopes by remarking "Allez-vous-en, mettre votre " uniform de général; vous avez l'air de Franconi."[1]

Meanwhile Caroline had been intriguing in Paris. She approached both Talleyrand and Maret, and is reported to have had liaisons with Junot and Fouché, no doubt to bind them to her side so that she might more easily carry out her desire, which was no less than to have her husband acknowledged as heir presumptive of the Emperor.[2]

Spain, 1808:—

After the peace Murat's territory was much increased, and he and Caroline kept up great state, until, on the 20th February, 1808, he was appointed Lieutenant General in Spain. Many troops were placed under his orders, and he was commanded to seize Pampeluna and San Sebastian, the latter of which he annexed in a manner not quite straightforward. He then advanced to Vittoria, Burgos, &c., but it is clear from his writings that he did not know what was expected of him. Possibly the Emperor was himself only feeling his way and could not give his Lieutenant detailed instructions. Murat is supposed to have been working for his own hand in Spain, but, whatever his ulterior motive may have been, he was undoubtedly working for his master, and he executed the business with some skill. On the 23rd March, he made a triumphant entry into Madrid, where he was warmly received by the populace, and plunged with zest into the intrigues which were in progress between the rival kings and courtiers. He put down with a high hand the insurrection which broke out on the 1st May—The Dos de Mayos—over the proposed departure of the royal family, a movement which he thought nothing of at the time, but which was long remembered in Spain and caused much bitterness of feeling. At the same time there is small doubt that if King Joseph had shown a little of Murat's spirit when dealing with his recalcitrant subjects, he might have remained upon his throne.

The choice of Joseph Bonaparte as King was a severe blow to Murat, who had hopes of retaining the kingdom for himself, and the offer made to him of the throne of Naples or Portugal did not go far towards allaying his disappointment. Caroline, however, was delighted. To be a queen was to be a queen no matter in what part of Europe, and somewhat soothed by this, her husband left the Peninsula and retired to recoup at Barèges.

Naples:—

On the 1st August he commenced his reign as King of Naples. He entered the city on the 6th September, when he produced a good impression on the Neapolitans, and scored an early success as a monarch by capturing the Isle of Capri from Sir Hudson Lowe, and a second by defeating an attempted landing of an Anglo-Sicilian expedition upon his coasts. Then, however, being badly supported by French troops, he failed in an attack on Sicily. Murat's wars, undertaken by himself, were never a success. Napoleon insisted on an offensive and defensive alliance with France, for which Murat

[1] A popular circus rider in Paris at that time.
[2] Memoirs of the Duchess of Abrantès; Junot was Governor of Paris, and Fouché Chief of Police.

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was to furnish 21,000 soldiers and 25 guns when called upon; also 6 battleships, 6 frigates, and 6 brigs, and to agree to the continental blockade. He had also to cede to the Emperor all his property in France,[1] but he received as compensation the principality of Benevente and 500,000 francs out of the Neapolitan subsidy. He made a good King in Naples and his wife at first made herself popular, but then she began to interfere in the government, and they both, dreaming of a united Italy, commenced intrigues against the Emperor.

Peace reigned for some time, and Caroline was sent to receive Marie Louise at Braunau, and conduct her to the capital. The bearing of the Queen of Naples towards her future sister-in-law was from all accounts intolerable, and the young Empress took a dislike to her which lasted as long as Caroline was a personage in European politics. On her return to Naples she interfered still more in affairs of state, and indulged in some disgraceful liaisons, notably with the Duc de Vauguyon and with one Daure, which drove her husband nearly mad and destroyed for ever the harmony of their married life. The situation was saved for a time by Murat being summoned to command the cavalry in the Russian campaign, and during his absence his wife appears to have governed with some ability.

1812:—

Murat joined the army at Dantzig and commanded four corps under the orders of Nansouty, Montbrun, Grouchy and Latour-Maubourg. The campaign of 1812 was for the French a great failure and the King of Naples took a large share in it. He began at once. For Montbrun had been ordered to stop the enemy destroying the magazines at Wilna, but Murat countermanded the order saying he would himself see to it. He failed, and when the Emperor abused Montbrun he stood silent, so that the other in his rage threw away his sword and swore to take no more interest in the proceedings. The Marshal kept his cavalry on incessant reconnaissance, whether this was his own, or the Emperor's order is not known, but the result was the same, namely, that men and horses were worn out without gaining any corresponding amount of information. Their ammunition ran short and the light artillery found difficulty in horsing their wagons. Murat forced the Russians to evacuate Drissa and established himself there and at Polotsk without much fighting, but with much loss; then, having gained a brilliant success at Ostrovna, where he charged amongst the cossacks with only a whip in his hand, and destroyed 4000 of the enemy, captured 700 prisoners, 8 guns and 150 horses, with a loss to himself of only 187 men, he tried at Vitebsk to charge the whole army, failed, and suffered a further check at Roudnia at the hands of Platoff and Pahlen. He took no part in Smolensk, but at Valoutina he rose to his highest level, for, when Junot remained inactive, he galloped to that general with fierce protests, and placing himself at the head of the Wurtemberg cavalry, he successfully charged the enemy, and, returning to the Duke of Abrantès, said, "Finish it now. Thy glory is there and thy marshal's baton."[2]

[1] Namely, the Elysée Palace, Neuilly, and the estates of Villiers and La Motte Ste. Heraye.

[2] Junot of course did not finish it and was never made a Marshal.

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Having advised the Emperor to continue the advance, he went on ahead, followed by Ney and Davout, with the latter of whom he had an old feud which created rows all the way to Moscow, and on one occasion nearly brought on a duel. He performed prodigies of valour at Borodino, where as Baron Lejeune has recorded, he was cheered even by the cossacks when they recognised him, and after Moscow the retreat commenced. Murat left Moscow with 10,000 men; he had 4000 when the army reached Smolensk, and only 1800 at the passage of the Beresina. On the 8th December he reached Wilna and took command of the army when Napoleon left it.

It is customary to blame Murat for this command, but really, when one considers his horrible position, it was not bad. The fault was that he was not a big enough man to cope with the situation, and the defection of Yorck from Macdonald tried his nerve too highly.[1] Therefore having got the army to the Oder, he left it on January 16th. Napoleon was gentle to him in "The Monitor." "The King of Naples," he wrote, "being indisposed, has decided "to leave the army, which he has placed in the hands of the Viceroy "who has greater administrative powers. He has the confidence of "the Emperor." To Caroline, however, he adopted a different tone. He wrote to her on the 24th January as follows, "The King of "Naples, your husband, abandoned the army on the 16th. He is a "brave man on the battlefield, but he is feebler than a woman or a "monk when the enemy is not in sight. He has no moral courage. "I charge you to convey to him the displeasure which I feel at his "conduct in this matter."[2]

1813:—

On January 31st, Murat joined Caroline in the castle of San Lucio at Casseta, and at her instigation spent the summer intriguing with the British, Austrians and Italians. In August, by order of the Emperor, he set out for Saxony and arrived at Dresden on the 17th. In the battle he commanded the left wing and was victorious over the enemy opposed to him, capturing 12,000 men and 30 guns during the fight and 4000 more men in the pursuit which followed. He then held up the army of Bohemia with success, and greatly distinguished himself during the retirement on Leipzig. After the battle he accompanied Napoleon to Erfurt, and then, to the loss of both be it said, obtained permission to return to his kingdom. Having arrived there, he concluded a treaty with Austria and a truce with Great Britain, and in January, 1814, he agreed to place 30,000 men at the disposal of the coalition to serve in Italy, whilst the Emperor of Austria guaranteed his Dynasty and the sovereignty of all his states in that country. On the day of signing the treaty Murat broke down and denounced himself as a traitor, whilst Napoleon when he heard of it was equally explicit, and called him "the Bernadotte of the South."[3]

[1] c/f Macdonald, page 12.

[2] This made no impression on his sister. As M. Turquan has written, she had lost all moral sense, political and domestic, and was simply working for herself alone.

[3] Pérignon had been their adviser, but the old Marshal left them after this.

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The end. 1815:—

When Murat feared that the Austrians meant to bring back Ferdinand to the throne of Naples, he again sought the friendship of his old master, but the plots and counter-plots which followed upon Napoleon's departure from Elba, proved too much for his patience, so, putting himself at the head of his ill-disciplined army, he attacked the war-hardened troops of Austria at Ferrara and again at Tolentino, thirty miles S.W. of Ancona, where he was routed. He returned to his capital disguised as a lancer, and, covered with dust and blood-stains, presented himself to his queen, saying, " All is lost save life. " I was not lucky enough to find death." He then embraced her and his children and fled. They never met again. He travelled to Ischia and landed on the coast of France on the 25th May, but the Emperor refused to see him, and he remained for some time in disgrace near Toulon. After Waterloo, he took refuge in Corsica, and then, filled with a desire of reconquering Naples, he landed with a few followers in Calabria, where on the 13th October, he was seized and taken to the castle of Pizzo. There he was tried by a court martial, before which he refused to plead, was sentenced to death, and shot. His last words were " Soldiers, aim at my heart, but " spare my face."[1]

Conclusion:—

Such was Murat. So passed one of the bravest of all the brave men in the Imperial armies, and the greatest cavalry leader of the Napoleonic wars. It is impossible to follow his character in all its complexity. Had he remained a simple marshal instead of becoming a King; had he married a good woman instead of Caroline Bonaparte; had she curbed instead of encouraged that taste for intrigue which his early successes gave him, and for which he was quite unfitted; he, like some of the others, might have gone down to posterity as an able and dashing soldier, who, after supporting his master through a series of merciless wars, had left the field of Waterloo full of honour to seek the repose which he had so well deserved. But it was not so. He is known as a traitor and an ungrateful one at that, and so it possibly will always be. Mankind is hard on weakness, especially domestic weakness, and most of his faults still lie on his own head.

[1] Murat sent a pathetic letter to his wife, dated Pizzo, 13th October.

"My dear Caroline, My last hour has come. In a few moments I shall "have ceased to live; in a few moments you will no longer have a husband. "Never forget me; my life was not stained by any act of injustice. Farewell "my Achille; farewell my Letizia; farewell my Lucien; farewell my Louise; "show the world that you are worthy of me. I leave you without a kingdom "and without means in the midst of my numerous enemies. Show yourselves "superior to misfortune; think of what you are and what you have been. God "will bless you. Do not curse my memory. I declare that my greatest grief "in the last moments of my life is to die far away from my children."

Caroline never received this letter. She read it long afterwards in the newspapers. One can only wonder if it touched her at all.

She settled near Vienna as Contessa di Lipona, and was badly treated by France and Ferdinand of Naples in matters of finance. Later she was allowed to settle in Florence, and in 1838 visited Paris and was granted an annual payment of 100,000 francs. She died on May 18th, 1839, in her 60th year.

The two sons went to America and married there, but Lucien returned to France, was in the Senate under Napoleon III., and left a son, Achille, who became a distinguished cavalry officer.

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There is no question, however, about his abilities as a leader of cavalry. Many before him, and some since, have equalled his exploits in Italy and Egypt; none have equalled those of 1805 and 1806. He shines not only as a personality who impelled large masses of horsemen to follow him in a deathride, but as an able leader, who thoroughly understood the arts of strategic reconnaissance and concealment, and who taught his subordinates to do likewise. It was many years before he had a true disciple, after his own men had passed away, and no man has ever gone to the grave who could have said with him, I made Montbrun, Lasalle and Grouchy, Kellerman, Nansouty, Milhaud, and Exelmans.

He knew at the end, as his brother-in-law knew, and as his friends had known for years, that he owed most of his misfortunes to her who should have helped him. And he forgave her, as his Emperor forgave him, and as posterity will doubtless excuse his errors. Neither her brother, her country, nor history, can forgive his wife.

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THE RUSSO-TURKISH WAR OF 1877-78;

The Initial Deployment of the Russian Army in Roumania, and the Passage of the Danube.*

BY

MAJOR F. B. MAURICE, *psc.*, Notts and Derby Regt.

A Lecture delivered at the Royal Artillery Institution, on Thursday, 3rd February, 1910.

Colonel A. Hamilton-Gordon, C.B., R.A., in the Chair.

THE CHAIRMAN: Ladies and gentlemen; if Major Maurice's earlier connection with Woolwich and the many acquaintances he has already made in the Regiment was not sufficient introduction, the fact of his being the son of Sir Frederick Maurice, would ensure him the warmest welcome in this gathering, which in your name I wish to offer. I should just like to say a few words before he begins his lecture on "The Russo-Turkish War of 1877." This campaign was chosen partly from the fact that it has been selected as a subject for examination. It is full of interest. The part selected for this evening is the deployment of the Russian Army in Roumania, and the passage of the Danube, because it is impossible to deal with the whole subject in one evening. I will now ask Major Maurice to favor us with his lecture. (Applause).

THE LECTURER: Colonel Hamilton-Gordon, ladies and gentlemen: It is remarkable that, though a number of Englishmen took a prominent part in the Russo-Turkish War of 1877, and that though probably no war in which English troops were not actually engaged has been watched with greater interest in England, it has been less studied by us of recent years than any of the great campaigns which took place during the latter half of the nineteenth century. Almost all the recent military literature on the subject comes from abroad. The explanation usually advanced for this, is that the war was not note-worthy for great generalship, and that many and glaring mistakes both of strategy and of tactics were made by both combatants. I doubt if this is an adequate reason for neglecting the study of a great war. "Fools" Bismarck was wont to say, "learn from their own mistakes, I have always contrived to gain my experience from the mistakes of others." It is indisputable that many of the chief lessons

* The lecture was illustrated by large scale maps showing the Russian concentration in Bessarabia, the deployment preparatory to the passage of the Danube, and the passage of the Danube. Only the general map has been reproduced. The remaining maps will be found in the volume of maps issued with the German translation of the Russian Official History.

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which we learnt at great cost in South Africa, were also the lessons which the Russian Army learned at an equally high price in the Balkan Peninsula.

For example, the premature bombardment of Magersfontein, the disconnected attacks at Paardeberg, the failure to understand the uses and limitations of infantry fire, the lack of appreciation of the powers of the spade the evil results of exhausting the horses of the cavalry at an early stage of the campaign, all these and many other of our experiences in South Africa, have their counterpart in the war of 1877.

The portion of the campaign with which I am chiefly concerned at present, namely the deployment of the Russian Army in Roumania, is, however, almost the only portion in which the successes of Russian leadership were more remarkable than its failures. My subject is one which it is difficult to make attractive, for it deals more with the business side of war, than with the clash of arms, and I shall have I fear, to make considerable demands upon your patience. I propose to deal first of all, briefly with the causes of the war, then to discuss the Russian plan of operations, next the strategical deployment of the Russian Army, and to conclude with a description of the passage of the Danube.

The composition of that part of the Russian Army with which I have to deal, and the general distribution of the Turkish forces in Europe will be found in the Appendix, and as I have little to do with fighting I do not think it necessary to burden you with a description of the armament, tactical training, or organization of the rival forces.

The war sprang from two causes. The first of these was the traditional policy of the Russian Chancellors, which had as its goal the acquisition of Constantinople, and of an outlet into the Mediterranean. This policy had received a severe rebuff at the Treaty of Paris in 1856, which concluded the Crimean War. By this treaty, the position of Turkey in Europe was re-established, while Russia was excluded from all access to the Danube, and was not allowed to fly her naval ensign in the Black Sea. The history of the "Eastern Question," as it was then called, during the period between the Crimean and the Russo-Turkish Wars is largely one of Russian endeavour to escape from the restrictions of the Treaty of Paris. After 1871, the paths of Russian statesmen became smoother, the chief opponents of Russian policy, Austria and France, had both suffered defeat in exhausting wars, and were in no condition to defend their principles. Germany was, in return for services rendered, disposed to be complacent. The general political situation in Europe was therefore favourable to Russian pretensions, and it was not long before an opportunity for action presented itself. In 1875 the people of Herzogovina, at that time a Turkish dependency, revolted, the insurrection spread rapidly to Bosnia, and thence to the Christian populations of Albania and Bulgaria. Montenegro and Servia which had become autonomous states took up arms on behalf of their co-religionists. The insurrections were repressed by the Turks with great severity, and England, which had always been a sturdy opponent of Russian designs on Constantinople was roused to detestation of Ottoman cruelty by Gladstone's fiery denunciations of the Bulgarian atrocities. The time was therefore ripe for Russian intervention. The Czar, who had always posed as the natural protector of the Christian subjects

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of the Turkish Empire, and the Russian people, were sincerely moved by sympathy for the Christian Principalities of the Balkan Peninsula. The idea of war with Turkey was therefore greeted by the Russian people with an enthusiasm which the calculated policy of Russian statesmen by itself could not have roused. On the initiative of Russia a series of conferences of the great European Powers was held to demand from Turkey, reforms in the Balkans. By skilful diplomacy, Russia contrived to get these demands presented in Constantinople in a form which was little likely to be acceptable to the Sultan and his advisers, and as the several conferences failed in their ostensible object, Russia proceeded quietly with the mobilization of her armies. As a final effort to avert war, a conference was held in London, in March, 1877. At this conference, contrary to the stipulations of the Treaty of Paris, Turkey was not represented. It formulated a proposal that Turkey should disarm, in which event Russia was to do likewise, but this proposal was accompanied by a reference to the Bulgarian atrocities, which could only be regarded as an insult at Constantinople, and it was rejected in toto by the Sublime Porte. On April 24th, Russia declared war, and on the same day, her armies crossed the frontier.

The Russian plan of campaign was conceived on a grand scale. It was intended to make a great converging movement on Constantinople by two armies, one moving through the Caucasus and Asia Minor, the other across the Danube and the Balkans. It is with the latter that we are now concerned, but it is important to remember that we are discussing only one of two campaigns carried on simultaneously. Russia had begun her mobilization as early as November, 1876, in order to give weight to her voice in the conference of the Powers. This mobilization was completed at leisure, and the armies were gradually drawn up to the frontier. A glance at the map will show that the first step across the European frontier, would take the Russian army into Roumania. This State was at the time nominally under Turkish suzerainty, but was virtually independent. Her government was anxious to keep out of the impending struggle, and acting more or less under compulsion, when the Russian troops were massed on her eastern frontier, she concluded in the spring of 1877, a convention with the Russian government, by which the latter was allowed free passage for its army.

The first great problem which the Russian Commander-in-Chief had to solve was, how he was to deploy his army in Roumania, preparatory to the passage of the Danube. It will be noticed that the frontier between Russia and Roumania in 1877 formed a right angle. The shorter face of this right angle led directly into the delta of the Danube, a marshy country liable to sudden floods, and unsuitable to military operations on a large scale. The greater part of the Russian army had therefore to cross the longer face of the right angle, and wheel to its left in order to reach the valley of the Danube. The flank upon which this wheel had to pivot had of necessity to be close to the Danube, that is to say, to the enemy's frontier. Special measures were therefore necessary to secure that flank. The two provinces of Roumania, Moldavia and Walachia, form another great right angle, and the roads leading from Moldavia into Walachia converge on two places, Focksani and Galatz, which are about thirty miles

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apart, and are at the corner of the right angle formed by the space between the Carpathians and the Danube. Through these two places the Russian army had, therefore, to pass.

It was next necessary to consider where the passage of the Danube should be forced, and in formulating their plan for this, the Russian General Staff had to consider also the question of crossing the second great obstacle which would confront them, the Balkan Mountains. The most direct routes to the ultimate object, Constantinople, crossed the Danube at Ismail and Brahilov, and led thence through the district known as the Dobrudja, by Varno and Burghas to Constantinople. This route had been followed by the Russian Generals Witgenstein and Diebich in their victorious campaign of 1828; but in that campaign, Russia had command of the Black Sea, whereas now, in consequence of the Treaty of Paris, she had no men-of-war in those waters, while Turkey could boast of a considerable naval force. Diebich had been able to shift his base from port to port as he advanced, but to commit an army whose communications must be confined to the land, and be liable to attack from the sea at many points, to the Dobrudja, which is a barren and fever-stricken region, was considered altogether too hazardous.

Westward of Nikopoli the main routes across the Balkans converge upon Sofia, but this line would obviously involve very long communications, liable to attack from the quadrilateral, and the area included by the four great Turkish fortresses, Silistria, Ruschuk, Schumla and Varna, was called. There remained therefore the portion of the Danube between Silistria and Nikopoli, from which good roads led through Osman Bazar and through Tirnova across the Balkans. This route presented the fewest difficulties, and it was therefore decided to make a preliminary deployment somewhere about Bucharest, with the object of crossing what we may call the middle portion of the Roumanian Danube.

Before considering the details of the execution of the Russian deployment, I must say a few words about the distribution of the Turkish forces. Time prevents my going into this question at any length, and you will find more complete information in the Appendix. It will suffice for my purpose to say that the regular forces of the Turkish Empire were, at the time of the outbreak of the war, much scattered, in consequence of the operations against Servia and Montenegro, and of the risings in the Christian provinces of the Turkish Empire. Roughly about 60,000 men were posted on the eastern frontier of Servia, chiefly about Widin under Osman Pasha, about 90,000 men were in Bosnia, Herzogovina and Montenegro, and, therefore, not to be reckoned with immediately.

The main Turkish force, consisting of about 100,000 men, was in Eastern Bulgaria, chiefly in the quadrilateral. All the chief points of passage over the Danube were garrisoned, in particular Tultcha and Matchin, opposite Ismail and Galatz, were known to be occupied, and a strong Turkish flotilla of gun-boats and cruisers, was in the main channel of the Danube between Galatz and the mouth of the river.

For the campaign in Europe, Russia had in November, 1876, mobilized the 7th, 8th, 9th, 10th, 11th and 12th Army Corps. Of these, the 7th and 10th Corps were intended for the protection of the

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coast of the Black Sea, a tribute to the power of the Turkish fleet. The remaining four corps were to form the active army. In December, 1876, three more corps: the 4th, 13th and 14th were mobilized to form a sort of general reserve, in case of emergency, and they did not leave their bases of mobilization till May 8th, some time after the declaration of war. In round numbers, the Russian forces available for the operations in Europe, were 200,000 men.

During the first months of 1877, the Russian Army was gradually concentrated in Bessarabia. The Russian methods are worthy of consideration. The plan was arranged with a view to the army being massed on the frontier for some considerable time. It was therefore necessary to quarter the troops comfortably, and to make it easy to feed them. This entailed the occupation of a large area of country, but at the same time the army must be prepared for the outbreak of war at any moment. The various Russian Corps were distributed in great depth along the main roads by which they were intended to advance. For example, the 8th Corps extended from Oumgheni to Tiraspol, a distance of ninety miles, or about 5 marches. Three corps were disposed in this way in the first line with their heads actually on the frontier, a fourth corps, the 7th, which was to watch the coast, was echeloned back on the exposed flank, while the 9th Corps was conveniently placed in rear to afford a general reserve for the active army. Thus at any moment, each corps could close up on its front, without interfering with its neighbours, and the army would find itself conveniently placed for manœuvre. This quartering in depth is recommended in our new "Field Service Regulations," and the preliminary deployment of the Russian Army in Bessarabia is an admirable example of the advantages it confers.

I have already pointed out the extreme importance to the Russians on general grounds of securing the angle of the Danube at Galatz and Brahilov, and this importance is emphasized when the details of the Russian advance are considered. As soon as the Russian army crossed the frontier of Bessarabia it would be confronted by two rivers, the Pruth and the Sereth, which flow through Moldavia into the Danube near Galatz. The most important of these, the Sereth, was in flood in April, 1877, and in its lower reaches had overflowed its banks to such an extent, as to make the construction of military bridges well-nigh impracticable. Throughout its course, it was spanned only by three permanent bridges, the first at Roman, the second between Tekutch and Focksani, the third at Barboshi, close to the mouth of the river near Galatz. Over this latter bridge, which was a modern, iron, rail and road bridge, 300 yards in length, passed the only line of railway which connected European Russia with Bucharest. It was therefore of the greatest importance to secure that bridge. As the mouth of the Sereth was navigable by the Turkish gun-boats, and there was a garrison at Matchin, surprise was essential. To secure this the Russians adopted the simple, and time honoured expedient of beginning operations before the enemy could possibly know that war was declared. The Czar Alexander signed the declaration of war in Kishinev during the forenoon of April 24th, and at 3 a.m. on that day, a specially formed column from the 11th Corps, which was nearest to Galatz, crossed the frontier near Kubei, and marched on the Barboshi bridge. The column consisted of three

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Cossack regiments, two Cossack horse artillery batteries, two field batteries, and two battalions of infantry. The distance from Kubei to Galatz is fifty miles, and in spite of considerable delay in crossing the Pruth, the cavalry reached the Barboshi bridge at 7 p.m. on the 24th. The first battalion of infantry, whose packs were carried for them in requisitioned carts, arrived at mid-day on the 25th, and the whole column had reached Galatz and the bridge by 8 that evening. By the early hours of the 26th, other detachments of the 11th Corps had occupied Ismail and Kilia, while during the 28th and 29th, the heavy artillery, and a specially formed Black Sea Naval brigade, reached Galatz by train from Jassy. Thus before the Turkish gun-boats were aware that war was declared, Galatz and the precious Barboshi bridge had been secured.

Batteries were now established on commanding ground at Brahilov, Galatz, and Reni, and soon drove the Turkish gun-boats, which had no deck protection, and could not elevate their guns sufficiently to reply, from the river. This work was completed by the Russian naval brigade, which by the end of April had established lines of mines across the mouth of the Sereth, and across the Danube at Reni and Brahilov. By these means the main Turkish fleet, which was anchored at the Sulina mouth of the Danube, was cut off, and their Eastern Danube flotilla was driven to take refuge in an arm of the river, under the guns of Matchin. Here it was attacked early in May by torpedo-boats, extemporised from light pinnaces brought down by rail from Jassy, and two of its principal vessels were blown up By this energetic action, the powerful Turkish fleet was neutralized, and one of the chief dangers to the Russian deployment was averted.

An amusing story is told by the late Sir Henry Hozier, who was the personification of the motto of the Royal Regiment, and managed to be everywhere where fighting was going on, of the destruction of one Turkish gun-boat. It appears that soon after the Russian batteries had been established at Brahilov, the masts of a Turkish vessel were seen over the tops of some trees, which were on an island, in the direction of Matchin. One of the batteries opened fire, and after the second round, a dense cloud of smoke was seen to rise from behind the island, and the masts tottered and fell. Clearly the gun-boat had been blown up. Great was the jubilation among the Russian gunners. The Commander-in-Chief, who had just arrived at Galatz, was informed. A parade of the available troops was hastily arranged, and in their presence the General embraced both the battery commander, and the No. 1 of the gun, which had fired the fatal round, and decorated them with the Cross of St. George. Sir H. Hozier, who was with the Turks, saw a report of this in an English paper, but he had seen the incident from the other side. The facts were that the Russian shell had not gone near the gun-boat. All the Turkish officers had gone ashore and left the vessel to their men, who it is presumed, started quarrelling, and upset a brazier of coals at which they had been warming themselves, into the magazine, which had been left open. The system of instantly rewarding good work in the field, which has many advocates, would appear to have its dangers.

While these events were taking place on the Lower Danube, and about Galatz, the main Russian army was moving through Roumania. At that time, the organization of the Russian army did not

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include independent cavalry divisions, the cavalry being incorporated in the various corps. But when it became apparent that the deployment of the Russian army would be a very delicate operation, requiring special measures for its protection a Caucasian Cossack division consisting of four Cossack regiments, with 6 batteries and the 4th Rifle Brigade attached, was formed into a special corps for this purpose, and placed under the command of Lieut.-Gen. Skobelov, generally called Skobelov the Elder, or Skobelov I., to distinguish him from the great Skobelov who became famous in the battles round Plevna, later in the war.

By May 8th, this force, assisted by the cavalry divisions of the 8th and 11th Corps, had occupied all points of passage over the Danube as far south as the Yalomitza river. By that date, May 8th, the 7th Corps had relieved the 11th Corps at Kilia, Ismail and Reni, the 11th Corps had concentrated about Galatz, the 12th Corps had reached Tekutch, and the 9th Corps was ready to follow by train from Jassy. Thus the dangerous corner between Galatz and Focksani was secured beyond question.

Meantime the Turks had done nothing beyond bombarding some of the defenceless towns on the Roumanian bank of the river. This had the effect of arousing popular feeling in Roumania in favour of definite action with Russia, and on May 11th, the Roumanian Government declared its independence of Turkey, and by a second treaty with Russia agreed, in return for recognition of its status as a kingdom and certain territorial concessions, to maintain a force of 70,000 men. The sterling qualities of the Roumanian soldiery, were not recognized at this time at the Russian head-quarters. The Roumanian army was looked on as a militia force, unfitted for serious operations in the field, and it was not until dire necessity compelled Russia to accept the services of the Roumanian army before Plevna, that it was appreciated at its true worth. At first it was allotted the duty of watching the Danube, and extended gradually further west as the Russian deployment developed. By May 24th this deployment as originally planned was completed. The cavalry divisions of the 8th and 11th Corps, and Skobelov's light division, watched the Danube as far west as the Aluta, where they connected with the Roumanian army, and thus protected the deployment from Turkish observation.

The 8th and 12th, half the 11th, and half the 9th Corps were assembled in and around Bucharest. Half the 9th Corps was moved to Slatina to support the Roumanians in the case of a possible Turkish offensive from the direction of Widin, the remaining half of the 11th Corps had been left at Galatz to assist in securing that vital point. Thus an intricate and difficult operation had been successfully carried out. The Russian staffs had had much to contend with, the spring of 1877 was an abnormally wet one, both the Pruth and the Sereth were continually in flood, one important bridge over the Pruth was carried away no less than three times, and the floods had swollen that river at Leova, where it is ordinarily seventy-five feet across, to a width of three miles. The railway too, had been of little assistance. There was a break in guage at the frontier, so that Russian rolling stock could not be used and the Roumanian rolling stock was so deficient, that not more than five trains could be forwarded daily at first, and these were all required in the early days for the heavy artillery,

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torpedo-boats, pinnaces, and other heavy stores. But in spite of all difficulties, an army of 150,000 men had been successfully deployed in 30 days, the greater part of it having marched 300 miles.

It had, however, already became apparent that the force at the disposal of the Russian Commander-in-Chief was insufficient for its task. Half the 11th Corps it will be remembered had been left at Galatz, though the whole of this corps was originally designed to form part of the active army.

The 7th and 10th Corps had been intended to secure the left flank and to watch the coasts, and in view of the menacing action of the Turkish fleet in the Black Sea, it had been found necessary to keep the 10th Corps as far back as Odessa. Now it was obvious that a Turkish offensive in the direction of Galatz would sever the Russian communications, and the force at that place was not considered sufficient to secure the army against such a danger. Therefore the three reserve corps, the 4th, 13th and 14th were called up thus early in the campaign. The 13th Corps was sent to join the main army and arrived at Ploesti early in June. The 14th Corps was sent to Galatz, and there with half the 7th Corps which was already about that place, was formed into a special detachment to secure the left flank, and placed under the command of General Zimmermann. The Russian Commander-in-Chief, rightly considering that the offensive was the best form of defence, ordered Zimmermann to cross the Danube, and advance into the Dobrudja. After some delay, owing to floods, Zimmermann achieved the passage from Brahilov on June 27th, and occupied Matchin. The Russian communications were thus finally secured.

With the arrival of Zimmermann at Galatz, the half of the 11th Corps at that place was relieved. The Russians had thus five army corps: the 8th, 9th, 11th, 12th, and 13th for the main passage of the Danube, and it was now time to consider the selection of the point of crossing. The Russian Commander-in-Chief's plan was, to push forward as soon as he had crossed the river, a strong force of cavalry and light troops to seize the passes of the Balkans, with the idea of threatening Constantinople, and compelling the Turks to abandon the fortresses of the quadrilateral to defend their capital. For a rapid advance it was necessary to use the best road, and the best passes not within the rayon of the quadrilateral fortresses. The road through Tirnova and over the Shipka Pass fulfilled the required conditions, and in order to be able to use this road, it was decided to cross the river somewhere between Ruschuk and Nikopoli. The choice of the actual point of crossing, depended upon the position of the enemy, the nature of the country, and the state of the river. Secrecy was of vital importance. It was therefore important to find a place out of reach of Turkish observation, in which a great quantity of bridging material could be got together. The river Aluta provided this, therefore the point of crossing had to be near and below the mouth of that river. The nature of the country on either bank, within the area selected, limited the choice to three points, one just south of Turna, the second at Flamunda, and the third near Simnitsa. The two first were almost directly opposite Nikopoli, where the Turks were known to have heavy batteries, and two gun-boats. The third had obvious advantages, a good road led from Sistova direct to Tir-

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nova; a creek on the left bank, with an island at its mouth, offered a covered place of embarkation, and a second island in the river would considerably shorten the length of the bridge necessary. The river Jantra offered a good defensive line, which the advanced troops could occupy against a Turkish advance from the quadrilateral. As to the Turkish troops in the immediate neighbourhood, there were 800 men and 2 guns at Sistova, and 3000 with 4 guns in Vardim, the garrison of Nikopoli on the other hand, amounted to about 10,000 men. All the advantages therefore were, so far, on the side of Simnitsa. The only disadvantage was, that the ground at this point was low and liable to sudden flood. It was therefore decided to cross at Simnitsa, if the state of the water permitted, and if not, at Flamunda. The grouping of the Russian army preparatory to the crossing pointed rather to a passage at Flamunda. This was intentional, and was part of the elaborate plans for secrecy adopted by the Grand Duke Nicholas. Confidential orders were issued to the commanders of the 9th and 12th Corps to prepare to cross at that point. The engineers were busy putting the material for the bridges together in the Aluta, the mouth of which is considerably nearer to Flamunda than to Simnitsa. Even the Czar himself was used to aid in the deception, he arrived at Turnu to see his army cross the Danube, and spent his time in observing the country on the right bank opposite that place. The state of the river being favourable, the Grand Duke Nicholas decided to make the crossing on the night of the 26th-27th June. The actual orders were issued on the 25th, the commander of the 8th Corps, whose troops were to make the crossing, was alone informed that Simnitsa was to be the point of passage. Batteries were established on the left bank to bombard Nikopoli, the 9th Corps was ordered to make a feint of crossing at Flamunda, and the 12th and 13th Corps were both ordered to move towards Piatra on their right, to assist in the deception. Under cover of these movements, on the evening of the 26th, the troops of the 14th Division of the 8th Corps were quietly assembled at Simnitsa. Batteries were placed in position at dusk, and 104 pontoons and about 100 boats were brought down by road, and launched in the creek at Simnitsa. The troops to make the crossing, were formed into detachments of 2,500 men. Two mountain batteries, each of four guns, were added to the first two detachments, and sixty cossacks with their horses to the first detachment. The means of transport were boats, pontoons, and rafts made of pontoons. Each boat or pontoon took thirty infantry, a raft took forty-five infantry, or two mountain guns.

Orders were given that in no circumstances was a shot to be fired, until the right bank was reached. The river at this point is about 1,500 yards wide. The time taken by the various boats was from three-quarters of an hour to one and a half hours, the difference being due partly to the fact that some of the boats did not allow sufficiently for the effect of the current, and some missed the landing place in the dark. The point selected for the landing was the mouth of a small stream called the Tekirdere. There was a Turkish picquet at this point, but it did not observe the Russian boats until the first of them were within about 300 yards of the shore, and its fire was comparatively harmless. This picquet, in the excitement of the moment, forgot to give the alarm signal and was rushed by the first parties

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which landed. Sufficient men, however, escaped to give the alarm both at Vardim and at Sistova.

Just as dawn was breaking, Turkish troops came up from both places and caught the Russians between two fires, while a Turkish battery, opening fire from the cliffs, sunk five boats, two mountain guns being lost, but the remaining guns of this mountain battery were successfully landed. These rendered timely support to the hard-pressed infantry, and enabled the latter to hold on until a continual stream of reinforcements, as boat load after boat load was disembarked, allowed the Russians to assume the offensive. As soon as it was evident that the first detachment had landed, and that concealment was no longer possible, General Dragomirov, who commanded the 14th Division, moved the point of embarkation some distance down stream, which considerably shortened the time of passage. While the second detachment was on the water, a Turkish gun-boat appeared from the direction of Vardim, and created considerable alarm. But once more the fire of the field batteries on the banks, proved superior to that of the gun-boat, and the latter was driven off, before it could do any damage.

By 8 a.m., the cliffs commanding the landing place were in Russian hands, and soon after, a steamer sent down from Flamunda, was able to carry and tow a complete regiment across in two journeys. This put the fate of the crossing beyond question, by 10.30 a.m., the whole of the 14th Division was across the river, and a few hours later the Turks had abandoned Sistova. By nightfall on the 27th, the whole of the 8th Corps, except its cavalry, had crossed, and thenceforward the work of ferrying continued without intermission day or night. The sections of the bridges put together in the Aluta, were floated past the guns of Nikopoli on the night of the 27th–28th, and the following nights, the bridges were completed early on July 2nd, and the main army, with the exception of one or two detachments, was assembled in Bulgaria by the middle of the month.

The passage of such a serious obstacle as the Danube, in face of an enemy, had been made with astonishing ease, the losses of the Russians amounted to only 800 killed and wounded. The whole incident forms an admirable example of the futility of attempting to defend a river line by a policy of passive resistance.

The Turks held possession of a number of fortified towns on the river, while those on the Roumanian bank were all open; further, their gun-boats gave them the means of securing command of the waterway. They therefore started with every advantage.

I have already pointed out the opportunity of harassing and delaying the Russian deployment, which they threw away, by not securing Brahilov and Galatz. This was primarily due to the fact that the Russians, in opening hostilities when they did, took them by surprise. But there was ample time to concert effective measures for the defence of the remainder of the river line. By energetic action on the left bank, by piercing the Russian cavalry screen, and by discovering the movements of the main army, the Turks would have gained some definite information on which to form their plans. Then with an efficient system of patrolling both on the river and on its banks, and with careful arrangements for communication, there would have been a reasonable prospect that they could have brought up a conveniently

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placed central force, in time to crush the first Russian troops to reach the right bank.

The system actually adopted of distributing a number of troops amongst the towns and villages on the right bank and of neglecting the left bank altogether, was certain to lead to failure.

The operations of the Russian army which I have described speak for themselves, and do not require much comment, they are an example of difficult and intricate manœuvring admirably conducted. The lack of enterprise in the Turks, no doubt made the problem which faced the Russians, much easier than it might have been, but the mere manœuvring of a large army in the face of great natural difficulties, was no light task.

There are a few general points with reference to the deployment, to which I wish to direct your attention for a moment.

The first of these is the outbreak of hostilities, and I hope the very brief sketch, which I have given of the events which led up to the war has been sufficient to show you that the Russian mobilization, and the movements of the Russian Army up to, and finally across the frontier, were carried out in the closest agreement with the handling of the diplomatic situation by the Russian statesmen. In other words, policy and strategy went hand-in-hand. That may be said to be an almost indispensable condition of success in modern war. We have seen that in this case, the safety of a delicate and intricate operation was secured by the co-operation of statesman and soldier. Turkey at the time, uttered a howl of protest, and appealed to the powers, against this violation of the customs of war. But such protests are, by their nature, too late to be of service. Yet how short is the memory of nations! In 1904, Japan followed almost exactly and with equal success, the procedure adopted by Russia in 1877. By beginning hostilities before the declaration of war could reach her enemy, Japan obtained an advantage which was of inestimable value. Then it was Russia's turn to protest against the treachery of her opponent. We must accept it, as a normal condition of our times, that when a power has anything to gain by beginning hostilities without formally declaring war, it will do so.

The next point which I wish to put before you for a moment, is the employment by the Grand Duke Nicholas of his cavalry. We are considerably influenced in our views about the employment of cavalry, by the writings of French and German strategists, and are accustomed to think, that at the outbreak of war, large masses of independent cavalry will start at once on missions of exploration, seeking to discover the movements and intentions of the enemy's main forces. This may well be the case for armies, whose mobilization and preliminary concentration had been worked out in great detail, armies which can be ready for active operations in a very short space of time; but that is hardly a situation in which our army is likely to be placed, and where a slow concentration has to be made, or a difficult deployment carried out, it is surely more prudent to employ the cavalry to protect and to screen. It is clearly of no use to send the cavalry off to explore, until the main army is in a position to act upon the information obtained., that is to say, until the initial deployment is far advanced or completed.

In the case which I have presented to you ,the covering of the

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movement past the dangerous corner at Galatz, the protection of the flank march to Bucharest, and the concealment of the preparations for the passage of the Danube, were certainly of greater importance to the Grand Duke Nicholas, than news of the enemy's main forces, which he could not meet until he had entered Bulgaria.

The river Danube of course, acted as a restraint to the movements of the cavalry, but I would suggest, that even had the Danube been only a frontier line, the employment of the cavalry should not have been very different. In such circumstances, it is no small part of the art of generalship, to select the right moment for the cavalry to give up its rôle of protection, and assume that of exploration.

In the words of our "Field Service Regulations": "The fundamental principle in the distribution of cavalry is that the Commander-in-Chief in order to gain full value from that arm must clearly determine what he requires of it, and group his units accordingly in a suitable manner and in sufficient strength."

That is to say, cavalry may be at one time protective, at another independent, but any rigid division between these duties, is foreign to the true spirt of cavalry.

I think the influence of the command of the sea upon this, essentially land campaign, is worthy of attention; as I have explained, one of the clauses of the Treaty of Paris, stipulated that Russia should not maintain any vessels of war in the Black Sea, which gave Turkey undisputed command of those waters. The full effect of this did not appear until a later period of the campaign than that with which I am now concerned; but even during the earliest days of the war, the effect is very striking. Though the Turkish fleet was relatively inefficient, though its action in the Danube was feeble and indecisive, and though its share in the active operations of the war was small, yet the mere fact of its existence compelled the Russians to allot, for the defence of the coasts, two Army Corps, of the eight originally mobilized for the campaign in Europe, and it further forced them to abandon the most direct line of advance on Constantinople, for one which subsequently involved them in great difficulties. Thus the Turkish fleet was from the first, worth at least 60,000 men to the Sultan.

The last point I have to put before you, has reference to the Russian plan of campaign. You will remember that in its broad outlines, it consisted of an advance on Constantinople, round both shores of the Black Sea. A double line of operation had become very much the fashion in 1877, in consequence of Moltke's brilliant campaign against Austria in 1866. But Moltke's double line was very different to that of the Grand Duke Nicholas. The Prussian general intended from the first, to unite his armies on the decisive battlefield, and his manœuvres aimed at the defeat of the enemy's main forces. The Russians, on the other hand, were aiming at a distant geographical object, and by no possibility could their two armies join hands on one battlefield. 60,000 men were detached to cross the Caucasus, and prosecute the campaign in Asia Minor. The evils of this dissemination of force did not make themselves felt until a later period of the campaign, than that with which I am concerned this afternoon. But we have seen how, almost before a shot was fired, the three reserve corps had to be absorbed. The Russians had made the mistake

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which we have so often made, of underestimating the powers of their enemy, and they were to learn by bitter experience, what is perhaps the greatest lesson of military history, that it is impossible to be too strong at the decisive point.

THE CHAIRMAN: If any gentleman would like to ask any question, or make any remarks, I feel certain Major Maurice would answer any questions? (A pause). As no gentleman has any remarks to offer, it only remains to me to offer Major Maurice our thanks for the great trouble he has taken to prepare the lecture, and to come down here and lay before us, the outline of the Russian Plan of Campaign in a very clear and interesting lecture, and on your behalf, I offer him a most hearty vote of thanks. (Applause).

APPENDIX I.

RUSSO-TURKISH WAR, 1877-78.

Approximate distribution of the Turkish forces in Europe at the time of the outbreak of war.

Regular Troops.

(i.) In the quadrilateral (Silistria—Varna—Rustchuk—Shumla) under Abdul-Kerim Pasha.

65 battalions, 12 squadrons, 192 guns.

(ii). About Widin under Osman Pasha.

74 battalions, 30 squadrons, 90 guns.

(iii). At Adrianople and Constantinople.

30 battalions, 18 squadrons, 18 guns.

The above were the main groups, there were besides a number of regular and 2nd line units in garrisons along the Danube and in the chief towns of Bulgaria, Roumelia and Albania. The actual total of regular troops available for operations against the Russians in Europe at the outbreak of war amounted to about 160,000 men.

In addition to these, 50,000 men were in Montenegro under Suleyman Pasha, 15,000 were in Bosnia and 10,000 in Herzegovina, and 20,000 in Northern Albania all occupied in dealing with Montenegro or the revolting provinces.

70,000 men were allotted to the campaign in Asia Minor.

The Turkish fleet amounted to 22 armoured, and 82 unarmoured vessels, many of the latter being river gun-boats.

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RUSSO-TURKISH WAR, 1877—78.

Organization of the Russian Army in Europe at the outbreak of the War.

ACTIVE ARMY.

Commander-in-Chief - Grand Duke Nicholas.
Chief of the Staff - General Nepokoishitski.

VIIIth Army Corps. Lt.-General Radetzky.			IXth Army Corps. Lt.-General Baron Krudener.			XIth Army Corps. Lt.-General Prince Shakofskoi.			XIIth Army Corps. Lt.-General Wannovski.		
9th Inf. Div.	14th Inf Div.	8th Cav. Div.	5th Inf. Div.	31st Inf. Div.	9th Cav. Div.	11th Inf. Div.	32nd Inf. Div.	11th Cav. Div.	12th Inf. Div.	33rd Inf. Div.	12th Cav. Div.

SPECIAL FORMATIONS (Army Troops).

Caucasian Cossack Div. Lt.-General Skobelof I.	4th Rifle Bde.	Black Sea Naval Bde.	3rd Engineers Bde.	Siege Park.	Imperial Escort.

Allotted for defence of Black Sea Coast—
VIIth Army Corps. Xth Army Corps.

Reserve Corps—

IVth Army Corps. Lt.-General Sotov.			XIIIth Army Corps. Lt.-General Hahn.			XIVth Army Corps. Lt.-General Zimmerman.		
16th Inf. Div.	30th Inf. Div.	4th Cav. Div.	1st Inf. Div.	35th Inf. Div.	3rd Cav. Div.	17th Inf. Div.	18th Inf. Div.	1st Don Cossack Div.

NOTE.—1. The normal establishment of each corps was 24 battalions, 18 squadrons, 108 guns. The artillery were corps troops.

2. Of the reserve corps the XIIIth had joined the active army before main passage of the Danube; the IVth corps joined shortly after the passage. The XIVth corps with half the VIIth corps and some of the cavalry of the IVth corps became the "Lower Danube corps" for the protection of the Russian left.

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A Note on the Verification of the Range.

By CAPTAIN H. MARRIOTT SMITH, R.F.A.

"WHEN the whole series depend on the correct observation of a single round, that round should be repeated, and another fired with 100 yards more (or less) elevation."—Field Artillery Training, page 128.

The principle so inculcated amounts to this: No range can be considered as verified unless 2 rounds have been observed over and 2 short. This follows from the error of the gun no less than from the possibility of a mistake in observation, or of a badly laid round.

If the range be about 4,500 yards, the possible error of the 10-pr. Q.F. is 140 yards; that is, if 4,540 yards be the true range, a normal round properly laid at that range may fall 70 yards over or 70 yards short.

Hence a single round laid at this target at a range of 4,500 yards *may* fall as much as 30 yards over, or one laid at 4,600 yards *may* fall 20 yards short.

Verification is therefore necessary, even assuming correctness of observation and laying.

How should the target be bracketted within the second pair of rounds, it can only be necessary to repeat the last two rounds, as we have already two over and two short. It is when the second pair of rounds are both over or both short that there is any room for doubt in selecting the ranges at which the third pair of rounds should be fired.

For instance:—

1.	4300^{x}	observed	—
2.	4600^{x}	„	+
3.	4400^{x}	„	—
4.	4500^{x}	„	—

The next rounds may be fired at 4500^{x}, 4600^{x} or 4600^{x}, 4700^{x}. It is here advocated that 4600^{x}, 4700^{x} should be chosen.

Supposing we give 4500^{x}, 4600^{x}, we either have

case a.	5.	4500^{x}	observed	—
	6.	4600^{x}	„	—
case b.	8.	4500^{x}	„	—
	6.	4600^{x}	„	+

In case b. we have successfully verified.

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In case a. we have still only one plus, and the verification must be continued. $4600^{\underline{x}}$, $4700^{\underline{x}}$.

Now adopt the second method and order $4600^{\underline{x}}$, $4700^{\underline{x}}$, for the third pair of rounds. We then get either

case c.	5.	$4600^{\underline{x}}$	observed	+

when we order " stop firing; $4500^{\underline{x}}$, go on," and are no worse off than in case b.; or we may get

case d.	5.	$4600^{\underline{x}}$	observed	—
	6.	$4700^{\underline{x}}$	"	+

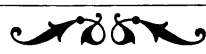
in which case we have two overs and two shorts, and a group of shell. 4500 −, 4600 + and −, 4700 +, which is sufficient verification. Here we save two rounds.

Should $4700^{\underline{x}}$ be short also, we find at the 6th round that no deduction can be drawn from the second. By the other method, this is not discovered until the 8th round, and two rounds are again saved by the proposed method.

In any case there may be a considerable gain of time and ammunition, and there can be no loss, except a few seconds in case c.

The rule for the procedure advocated may be formulated. " If of the first four rounds three are over and one short, fire the next pair, one at the lower elevation of the long bracket and one at an elevation less by 100 yards.

If three are short and one over, fire the next pair, one at the higher elevation of the long bracket and one at an elevation more by 100 yards."



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ATMOSPHERIC REFRACTION.

A neglected Factor in the Design of Automatic Sights, and Range Finders.

By LIEUTENANT H. J. JONES, (I.O.M.), A.O.D.

IN the "Proceedings of the Royal Artillery Institution," Vol. XXII., 1895, p. 269, will be found an admirable discussion of Atmospheric Refraction and Mirage, by Major P. A. MacMahon, F.R.S., R.A. This paper, read at a time when automatic sights and position finders were booming, was mainly directed towards elucidating the effect of atmospheric refraction on the sighting of field guns; the far more important case of the effect on coast defence sights and range finders was comparatively neglected. It is thought, however, that a restatement and amplification of the facts, will show that this neglected factor of refraction is competent to cause very large errors; and, that with the present tendency to extend fighting ranges, the errors arising from variable atmospheric refraction may be comparable with, and even greater than, those caused by the neglect to apply a correction for rise and fall of tide.

A considerable mass of literature dealing with the subject, published during the last fifty years, has been consulted; and the results of modern investigations obtained either from the Directors of the organised Trigonometrical Surveys, or from the published Reports of great Geodetic operations. The information thus collected gathers an added value from the comprehensive and authoritative nature of the source.

The term atmospheric refraction means the deviation from a straight line path which a ray of light undergoes when passing through strata of the atmosphere of varying density. If O be an object sighted from an elevated station T, the path of the ray is not, normally, the straight line path of OT, but the curved path OT; and the angle of depression of the object O, as seen from T, is not the angle OTH, but an angle greater or less than this by an amount α, the so-called angle of refraction. This angle is the inclination of the straight line path, to the tangent of the actual path, at the point of observation. If, as would normally be the case, the lower strata of the atmosphere were the denser, the path of the ray would be the upper curved path OT, and the angle of depression MTH. But under temporary and anomalous circumstances, an invertion of this density state may take place, heavy layers of air in motion being superimposed on lighter layers beneath; and then, the path of the ray would be the lower curved path OT, and the angle of depression PTH.

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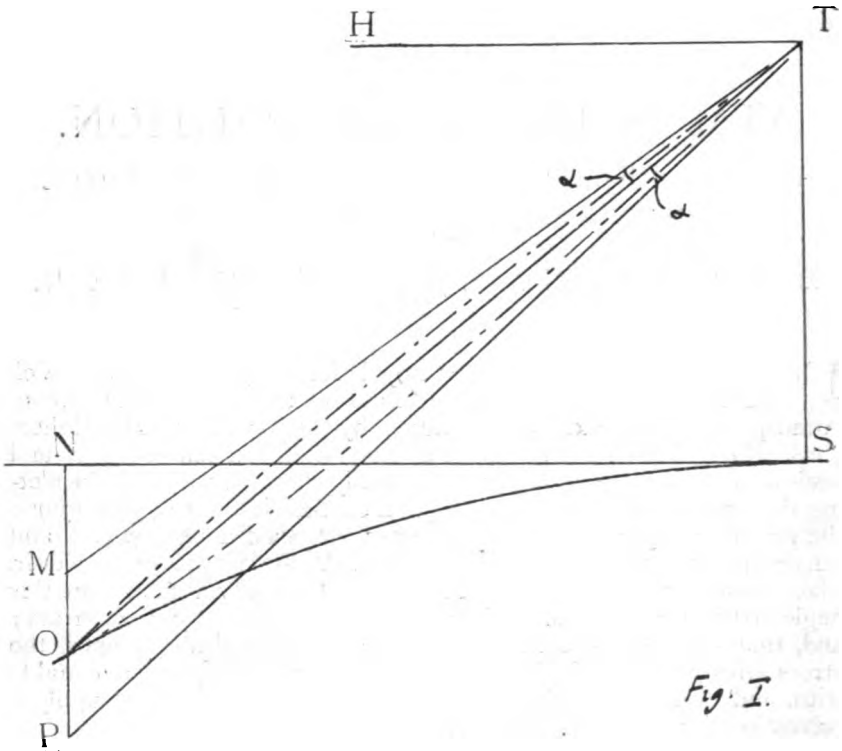

Fig. I.

Restricting the discussion to the case of coast defence sights and range finders, it will be seen that if O be the target on the water level OS, the angle of depression actually assumed by the telescope at T, corresponds not to the actual position of O on the water level, but to a vertical position M or P, above or below it. And the height of the telescope above the target, corresponding to the angle of depression of the sight, is not TS,—the height of the telescope above mean sea level at the battery—together with NO, the correction due to curvature; but is TS together with NM or NP. In other words, as defined by the angle of depression, the battery may appear to be at a height above the target, greater or less than the actual height.

The angle of refraction, α, is usually expressed by a coefficient as a fraction of the angle subtended by the two stations, O and T, at the centre of the earth. The refraction may be also conveniently defined by the relation between OM, OP and ON; in other words by the amount which it causes the target to be above or below the actual position due to curvature.

Assuming Clarke's figure of the earth, it may be shown that the correction for curvature is 8 inches per mile, and varies as the square of the distance. The correction is thus equivalent to ·21522 feet at 1000 yards, and 21·522 feet at 10,000 yards. Expressing the correction for curvature in feet as $\frac{2}{3}$ d^2, d being the distance in miles, we may write the correction for refraction as $\frac{-4}{3}$ k d^2, k, being the co-

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efficient of refraction; and the combined correction thus becomes

$$\left(\frac{2-4k}{3}\right)d^2$$

The coefficient of refraction is found practically by taking reciprocal vertical observations between two stations. The sum of the reciprocal vertical angles, together with the angle subtended at the centre of the earth, would be 180°, if there were no refraction; and the excess gives the sum of the refraction from both stations. Assuming the path of the ray of light to be an arc of a circle, half the total refraction is taken as the refraction at either end. Experience shows, however, that the refraction at the lower station is nearly always greater than that at the upper. Bauerfeind, and Jordan have proposed rational methods of determining the equation to the refracted ray, and hence of the coefficient of refraction. The investigations involve a knowledge of the physical condition of the atmosphere as to temperature, pressure, and humidity; and assumptions as to the mode of alteration of these factors with altitude. The Hysometric Reports of the United States Coast and Geodetic Survey, 1876, 1883, contain most valuable and comprehensive information respecting the accuracy of the above methods.

The variation of the coefficient of refraction was originally made the subject of research by Hawksbee, about the middle of the last century. Hawksbee's figures were used by Laplace. The question was taken up *de novo*, by the Committee of the French War Office 1860-1870, when deciding the preliminaries of the revision of the French Ordnance Survey; and the conclusions arrived at substantially confirm the accuracy of the early researches.

It is evident that not only the absolute value of the coefficient of refraction, at any time, but also its probable and possible variation, is defined and restricted by the probable and possible density-state of the lower strata of the atmosphere; in our case, strata extending from sea level up to heights of about 1000 feet, but usually to heights considerably below 300 feet, and under the most varied conditions of temperature and humidity, ranging from the North of Scotland to the Tropics. In view of the systematic change of general meteorological conditions which obtains throughout the day and night, and throughout the seasons, we should naturally expect a corresponding systematic change in the coefficient of refraction. But it is a matter for great surprise to note the extent and the rapidity of the changes of refraction which are frequently taking place.

Probably the earliest observations on terrestrial refraction were associated with the practice of nautical surveying, and the determination of a ship's position at sea. It was often noticed that when the sea was warmer than the air, the horizon appeared below its mean position; and when colder, above. An error in the dip of the sea horizon is commonly found on the edge of soundings, and at the mouths of large rivers. The error is particularly marked in the vicinity of the Gulf Stream. The diurnal variation of the atmospheric refraction is a frequent cause of the difference between forenoon and afternoon sights, taken from a ship at anchor. In the Red Sea and Persian Gulf, the apparent displacement of the horizon owing to the

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hot desert winds is very marked; and in these, and in fact most tropical regions, positions, fixed by the visibility of shore lights, are liable to very large errors. It is not uncommon to observe a light at 35 miles, when it should be invisible beyond 15 miles; and for the light gradually to disappear at 25 miles, re-appearing again at the normal distance. Lights sighted across ice floes, or islands covered with mist, invariably exhibit this phenomenon.

Fowler records some extraordinary observations made on the dip of the sea horizon, from a height of 132 feet; and similar results may be found in the Report of United States Coast and Geodetic Survey, 1876. Fowler found that the dip of the horizon differed greatly from the ordinary tabulated value, and varied in different parts of the horizon, a circumstance verified by the writer from a station at 40 feet, in Colombo. The normal dip from a station at 132 feet, under average pressure and temperature conditions, would be 0°—11′—20″, whereas the maximum and minimum values observed were 0°—21′—35″ and 0°—5′—5″; a total variation of nearly 16 minutes. The distance of the horizon was about 12¼ nautical miles, and remembering that the angle of refraction is directly proportional to the distance, we are confronted by the fact that at ranges of from 10,000 to 12,000 yards, atmospheric refraction had a diurnal variation of the order of 5 minutes. Between 12.30 p.m. and 3.15 p.m., on one day of observation, the dip increased by 14 minutes. Under these circumstances it will be conceded that a laborious attempt to set automatic sights to the tenth of a minute, would be a piteous waste of time.

The uncertain magnitude of the daily variation of atmospheric refraction is well known, and it is for this reason that in accurate topographical work, back angles are observed at about the same time of the day as forward angles, and always during the so-called "time of minimum refraction"; which usually commences about an hour or so after apparent noon, and lasts two or three hours. During the period of minimum refraction the coefficient usually remains fairly constant, but local conditions may cause very violent and anomalous changes. In any case it will be remarked that the time of minimum refraction, namely, within two or three hours of apparent noon, is not a time usually considered favourable for a naval commander to engage coast defences. On the other hand, during the hours of darkness, or semi-darkness, and under bad weather conditions, periods favourable for the engagement with coast defences, the refraction is exhibited at its maximum and most capricious values.

From low sited batteries, where rays pass over water near land, or across the discharge of a river, the refraction may pass through zero value, and give negative results. And, generally, the refraction at any time may be greatly altered by a change in general meteorological conditions, such as wind, brightness, clouds, &c. The predominant controlling factor, however, is the temperature gradient in altitude. The conventional temperature gradient is about 1°F. for every 300 feet, but variations of between two and three hundred per cent. may be met with; and occasionally a reversed gradient, the temperature increasing instead of decreasing with altitude. The more rapid the decrease of temperature with altitude, the smaller the refraction; and *vice versâ*. With a sufficiently rapid decrease the

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refraction may become zero, and even be negative. With no decrease, or for a constant temperature, the refraction is very large, and will yet increase, should the temperature increase (with the height), instead of decrease. Winds at different altitudes, the currents having different temperatures, sufficiently explain such occurrences.

Accurate topographical work has shown that, excepting special localities, the mean coefficient of refraction at about its minimum value, is nearly the same throughout the world. Furbir gives the coefficient as deduced from 100 lines, as ·0608 ± ·0006; and Johnson from 137 lines in the New York State Triangulation found the value to be ·073. The United States Coast Survey found the coefficient to be ·071 between primary stations, ·075 for small elevations, and ·078 for the sea horizon. For the lesser work of the Indian Survey, a value ·070 is used, and in observations towards the sea, ·055. In the South African Survey, a value ·064 was obtained; in Burma, ·067; and in the United Kingdom, ·081 for sea rays, and ·075 for land rays. MacMahon gives the mean summer value for the United Kingdom as ·05, and ·15 for water; and notes that values up to ·50 have been obtained. Walker for Indian Survey work on long lines gives the coefficient as varying from +1·2 to −0·09; and gives the interesting case in the Western Himalayas, where the coefficient decreased with height on the North, and dry side; but increased with height on the North-West and moist side.

Experience shows that from low stations, where rays pass along the ground, or over water, the refraction is most capricious; but that from elevated stations, namely, those above about 1000 feet, it exhibits a regular systematic diurnal change; although it may remain practically constant for days or weeks, showing either an extremely high or an extremely low value. Speaking generally for low sited stations—from 100 to 250 feet—the coefficient may vary throughout

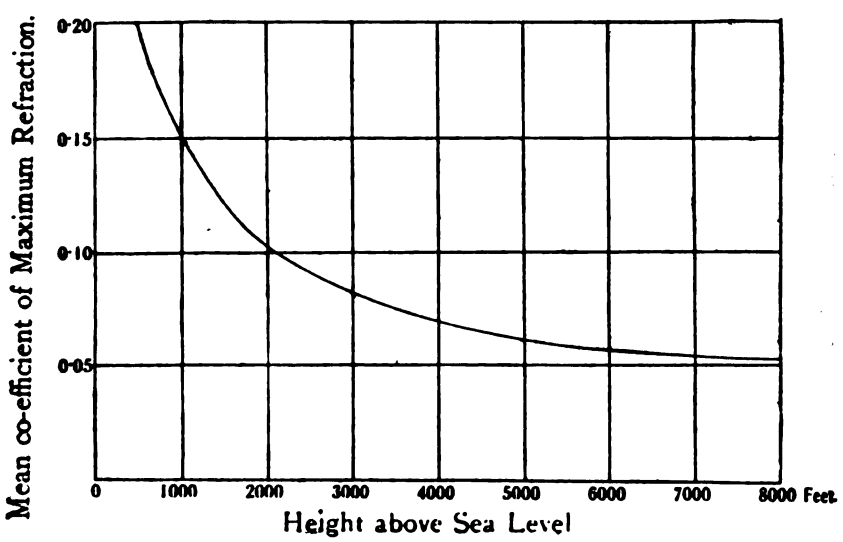

FIG. 2. Curve showing variation of co-efficient of refraction with height above sea level, for climate of Ceylon.

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a range similar to that given by Walker; and the changes may be as rapid as those found by Fowler. In other words, the refraction correction may compare, on occasion, with that due to curvature itself, namely, 21·522 feet at 10,000 yards, and thus easily swamp all corrections for ordinary tides. And further, the refraction may vary at a much greater rate than any tide. Since refraction, like curvature, increases with the square of the distance, an accurate correction for refraction becomes increasingly important as fighting ranges are extended. Fig. II. illustrates the mode of variation with height above sea level of the mean value of the coefficient of refraction, at the time of minimum refraction, for the climate of Ceylon.

In the design of automatic sights and range finders generally, the correction for refraction is assumed to be always negative, and to be from one-sixth to one-seventh that due to the curvature of the earth; so that at 10,000 yards, the combined correction for curvature and refraction is $\frac{6}{7} \times 21{\cdot}522 = 18{\cdot}447$ feet, if we take the coefficient of refraction as one-seventh. But as pointed out, this value of the coefficient corresponds to the average mean value at or about the time of minimum refraction; and thus the excess refraction, which must always be met with in actual practice, has to be included in that convenient, but generally misleading term, " the error of the day."

In addition to the vertical refraction, so far considered, it is obvious that there will be a corresponding bending of the ray of light in a horizontal plane, if a variation of atmospheric density is met with throughout the length of the ray. It is a common experience, when surveying over damp or marshy ground, or along a hot sandy beach, to find enormous fluctuations of the image, and with a gusty wind, under such conditions, it is practically impossible to keep the image on the cross wires at all. The effect of this variable horizontal refraction is readily seen when using short base range finders, such as the Barr and Stroud or Marindin; and also the ordinary horizontal base P.F. Instruments of the short base type may be set up at a testing station, in a sheltered position, and accurately adjusted for a well-defined vertical line, such as the edge of a distant building; but throughout the day the instrument will exhibit a systematically changing error, by the want of coincidence of the images, particularly if the weather is at all unsettled. This error arises partly from temperature strains in the instrument itself, but even after precautions have been taken to keep the temperature of the instrument constant, a large variable error remains due to horizontal refraction. It has been found impractable to separate the effect of temperature strain and horizontal refraction, but under service conditions a total error of about ten per cent. must be expected at ranges from 2000 to 2500 yards.

Horizontal refraction affects the horizontal base P.F. in a similar way, but in an aggravated manner, since with a long base the atmospheric conditions, at each end, may be very different, and the instruments are usually at a low site, and consequently receive the highly objectionable rays glancing along the surface of the water. The magnitude of the errors likely to arise may be calculated by allowing at either station a maximum error of training of 30 minutes—or one

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degree for the closing of the two sides of the horizontal triangle. This error, when the target is in such a position as to give the P.F. a short effective base, is very considerable.

It must be remembered that all range finding instruments which give direct readings, are liable to a common error when the conditions under which they are used differ from those obtaining when their graduations were made by observations on a scale at a distance of about 50 yards. To construct the scale, refraction is either neglected, or assumed at a mean value. In any case subsequent tests against distant objects, under different atmospheric conditions, will invariably show the instruments to be out of adjustment. In the case of the horizontal P.F., the training scale being in degrees, is not dependent on a calculated scale for its accuracy, but owing to horizontal refraction the incorrect training of the target is found, and an error in training becomes translated into an error in range.

When we remark, however, the nature of the correction for vertical refraction, it will be seen that it is a very simple matter to provide an accurate correction; a correction such that when determined for any one range, shall be automatically modified to suit all other ranges. In making calculations for the design of an automatic sight, or range finder, we may include the average mean value of the coefficient, and then, by laying on a datum post at a conveniently long range, ascertain what the actual excess refraction is. The quadrant elevation corresponding to the range of the datum, would be put on the gun; then the angular correction necessary to bring the telescope on the water line of the datum, would represent the excess refraction at that range; or, we may exclude refraction altogether from the calculations, and use the datum method to ascertain the total actual correction for refraction. The angular correction for refraction found at the range of the datum, has then to be mechanically modified, so that the correction is always proportional to the range. The datum mark to which reference has to be made to determine the actual refraction at any time, may be the water line of the datum post, or preferably a well-defined line on the datum post, clear of the water level at all tides; and the height of the datum mark, as well as the height of the battery or. P.F. post should be obtained by accurate levelling from the official bench mark, the height above mean sea level and position of which can always be obtained from the local Port Side Tables. The height of the battery or P.F. post should not be calculated from the observed angle of depression to the datum, because, since reciprocal observations cannot be taken from the datum and the battery, some assumption will have to be made as to the coefficient of refraction between the battery and sea level.

The automatic sight has been in the service for nearly fifteen years, and has remained substantially unchanged since the day of its introduction. While the accuracy of gun fire, and the stability of mountings, has greatly increased, the automatic sight has been falling into disrepute. And the cause is not far to seek—a rough correction for tide, no correction for altered muzzle velocity, no correction for change of ballistic coefficient, no correction for variable refraction, and an approximate correction for tilt. Is it too much to expect that after fifteen years it will now respond to the stimulus of change?

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AUTOMATICITY.

The quality of being automatic.

By CAPTAIN J. D. B. FULTON, R.F.A.

IN these days of highly-developed artillery *matériel*, the officers and men responsible for the service of a battery have to do a great deal more thinking than in the old days. Guns have progressed considerably since the good old times when the firing of a round was the signal for the whole of the personnel of a battery to double to a flank, in order that the fate of the projectile might be more closely followed. Incidentally, it would appear that fire discipline has improved likewise; and there are those who maintain that the improvement has not been confined to *matériel*, but that it has been accompanied by increased efficiency in the officers and men as well.

Be this as it may, the net result of improved weapons is that greater calls have been made on the intelligence of the men who use them. Indeed, it is a moot point whether we are not fast reaching a stage at which the potential efficiency of our guns will fail to reach its highest development owing to the difficulty of training large numbers of men to be sufficiently dexterous, both mentally and physically, to use them to the best advantage. The gun is improving faster than the man.

A considerable amount of calculating has to be done, sums have to be worked out in the head, formulæ remembered and applied. Officers have been asked to familiarize themselves with such nightmares as the slide-rule: men with such spectres as the plotter. Spirit-levels are common objects by the wayside wherever gunners congregate. Shakespeare would have been interested to see the respect which in these days is accorded to the first-class layer who achieves the "bubble reputation" at the cannon's mouth. Even the trumpeter will no longer blow the "advance for action", except in the Christmas numbers of illustrated journals. No: he saves the situation, and turns the tide of battle by producing—the plotter.

But all soldiers, even in our Regiment, are not phenomenally gifted with mathematical powers, and to some of us, for whom even the very words "apex-angle" and "displacement-difference" used to bristle with strange terrors, there is being borne a suspicion that the willing horse may be a trifle overworked. There are processes which present no difficulties to the student of the drill-book as he sits nightly by his fire improving his mind. Their intricacies can even be mastered at battery gun-drill, where a considerable degree of sang-froid can be derived from the knowledge that a few degrees more or less, or the substiution of a *plus* for a *minus* sign will make no material difference

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to the success of the parade. But in my experience and humble opinion, it is a very different matter to go accurately through these processes at the practice camp, under the attentive gaze of a most-observant staff-officer with a note-book and a stop-watch. It is then that the ideas, which at battery gun-drill had flowed in such orderly succession fuse together into an immovable and inextricable mass, and the stately minutes of the barrack-square become electrified into the nimblest of seconds.

A battery sergeant-major who detects a far-away expression in the B.C's face, and seizes the supposed moment of leisured calm to make some respectful quip, is practically taking his life in his hands: for his superior is probably trying to subtract 1° 53′ from 2° 19′ with one lobe of his brain, while, with the other, he is searching for some plausible explanation to account for his "switch" being 13 degrees out. It is almost impossible to realize that such convenient articles as either the plotter or director have never been used as lethal weapons: a fact which speaks well for the self control of battery commanders.

It seems reasonable, therefore, to hope that efforts will be directed towards reducing the amount of high-pressure ciphering which has to be done, by introducing instruments or other devices which shall substitute as much "automaticity" for brain work as possible.

An excellent example of what I mean occurs to me. Some years ago, when indirect laying by means of an observing station at some distance from the battery first began to be developed, a suitable method had to be chosen for carrying out the problem known as "the solution of a triangle", two sides and the included angle being known. I have no doubt in my own mind (though I cannot speak from certain knowledge!) that the first expedient which presented itself to the mathematicians amongst the pioneers of this system was that of solving the T.O.B. triangle by means of a book of logarithmic tables. For one reason, and one only, I regret that this method has not survived—It would have been almost worth the trouble, if one could have seen some of the efforts of one or two of our regimental caricaturists, portraying a somewhat flustered major consulting the bulky tome carried in the field, by, I suppose, our friend the trumpeter.

The log-book having been condemned, the next method followed in natural sequence—the slide-rule. In this case, it is certain that considerable efforts were made to get that instrument introduced as the recognised means of dealing with the problem; luckily without success, for even the most strenuous advocates of the slide-rule must by now be convinced that cyphering by its aid, in the turmoil of action, is not an operation conducive to accuracy.

Fortunately, a third possible method of solving a triangle was introduced, and the fact that the plotter is now part of the equipment of every horse and field battery is an excellent example of the survival of the fittest. With the plotter, in contra-distinction to the slide-rule, no calculations have to be made, no figures carried in the head, and no *plus* or *minus* sign has to be remembered and applied. Graduations are not so small as to be read with difficulty or easily mistaken; and, most important of all, data set on the plotter remain capable of being checked after the result has been obtained.

Now the part I wish to bring out is, that the plotter is what I

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call automatic. A given number of hundreds of yards is set by a straightforward movement of a pointer; a definite angle is clamped on in the same way—and the plotter literally "does the rest." No thinking here, and no chance for error to creep in. The plotter is a calculating machine, in just as full a sense as the adding and substracting machines which have been produced; on both of them certain data are set, and the answer is read off.

I venture to give another example of this quality of automaticity. A reference to Chapter IV., of "Field Artillery Training" will reveal the method laid down for finding at the observing station, the angle of sight to the target when the latter is not visible from the battery—that familiar formula:—

$$\frac{a^1 \times BO \times a^2 \times OT}{B\,T}$$

Where a^1 and a^2 represent quantities which present themselves to me now, as I write, with considerably greater clearness than, I fear, they ever do at practice-camp.

It occurred to me that if this calculation could be eliminated, the officer at the observing station would be saved pencil and paper cipher-ing to that extent; and I was able to devise an addition to the director by which the angle of sight from the battery to the target can be ascertained automatically at the observing point without calculation of any kind. Some directors fitted with this addition have already been in use.

The development of devices of this kind should contribute towards rapidity and accuracy of results. The substitution of mechanical movements (in the sense that setting a pointer or laying a sight are mechanical movements) for brain effort to attain the same end will tend to lighten the already heavy burden imposed on the controller of a battery. In addition, it can be argued that mechanical movements are much more reliable than mental efforts at a time when the attention is likely to be distracted; indeed this fact of greater reliability has been often conceded. Did we not teach our loading numbers at gun-drill to "go through the motions" of removing safety pins from fuzes, in preference to impressing on these frequently intelligent men the great desirability of this aid to efficiency? Why? Because we are more ready to rely on mechanical than on mental accuracy.

I believe that many of the operations of controlling a battery now entailing mental effort are destined to be performed at least as well by mechanical means; and in this connection I hope to be allowed in the near future to outline a scheme in the Journal by which fuze-setting may be abolished, and the battery commander relieved of one more care by dismissing such troublesome articles as fuzes for ever from his thoughts. But it is enough at present to indicate that in the triumph of mind over matter there are times when matter, to say the least, can put up a very good fight.

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Military Telegraphs and Telephones.

GERMANY.

Compiled from the
" Handbook of the German Army " and various German publications.

By LIEUTENANT A. E. A. DOBSON, R.G.A.

TELEGRAPHY.

IN the German army the system of telegraphic communication is most complete.

Regarding the employment of personnel and material there are four distinct zones:—

The most advanced zone (the 4th) consists of temporary lines along, and in advance of, the front of the armies. Next to it is the field zone (the 3rd), connecting up, by means of a field line, the fourth zone and the various head quarters. In rear of this is the Lines of Communication zone (the 2nd), where the field communications established in the two front zones are improved upon, and joined on to the first zone; the latter completing the communication with the State railways.

4th Zone:—

In the 4th zone, the laying and working of the lines is done by the Cavalry.

In the Cavalry the largest unit which has telegraphic equipment is the regiment, and this is in two portions, (1) "the patrol equipment" and (2) "the equipment for special purposes."

The patrol equipment consists of the Patrol apparatus "The Scout Field Telephone" with telephone at the top, microphone at the bottom, and the sounder inside case, and sufficient material for making a new line. For connection with an existing line the necessary additional material is carried. A bare conducting wire, cavalry wire (1/5" thick) is used.

The patrol apparatus can be fixed on any wire, and can be used even with non-insulated wires lying bare on the ground.

In dry weather over the cavalry wire, by means of a sounder, communication is possible up to about 18 miles, and with the microphone up to 10 miles. Over well insulated wires communication with the sounder is possible up to 90 miles. It is worthy of notice that with well insulated wires the Patrol apparatus can be used without disturbing the simultaneous work of the Morse instrument. Finally, by means of the Patrol apparatus, the enemy's messages on a wire can be taken, either with the telephone or the sounder by tapping the wires. Each regiment has two Patrol apparatus with two head

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telephones, four cavalry batteries, five miles of cavalry wire on eight coils, and one cavalry cable of 400 yards long for laying through rivers.

All the equipment is constructed so that it can be carried in saddle bags and cases on a horse, or in a cavalry telegraph wagon.

As personnel, each regiment has a telegraph patrol of four N.C.O's and men .

For each regiment there is a two-horsed cavalry telegraph wagon which carries "the equipment for special purposes" and a reserve supply, and also a light Field Telegraph Apparatus constructed on the principle of the ordinary Morse recorder. Compared to the Patrol apparatus it can only be used with well insulated wires, and written records can be obtained. With this apparatus it is also possible by means of tapping to take messages that are on the wires. Each regiment has only one field telegraph apparatus. A Patrol apparatus cannot be used in conjunction with the light Field Telegraph Apparatus, as the former is worked by induction currents, and the latter by electric currents.

The cavalry telegraph wagon carries also 12½ miles of wire for the light Field Telegraph Apparatus and 12½ miles of cavalry wire, The cavalry telegraph wagons are light vehicles, that can move over grass and plough.

3rd Zone:—

In the 3rd zone, the work is done by special telegraph troops. The telegraph troops under an inspector of telegraphs consists of:—

Three Prussian battalions (of three companies each).
One Bavarian detachment (of 2 companies).
Establishment: 66 Officers, 1,564 men.
The vehicles of the telegraph troops are horsed by the A.S.C.

On mobilization it is probable that six Army telegraph sections, 23 Corps sections, and 48 Divisional sections will be formed altogether about 3,900 men. These sections are under the orders of the respective Chiefs of the Staff.

The material of an Army telegraph section is sufficient to lay almost 85 miles of wire, mostly bare wire, and 14 apparatus are carried. If great rapidity is required the field cable is used. This forms an important part of the equipment of the Corps and Divisional sections, as these have often to get new lines as quickly as possible into working order, and there is not time to erect poles and carry out insulation. These sections also have some bare wire, but it is of rather lighter nature than that carried by the Army sections .

Each Corps telegraph section consists of 22 wagons and 120 men, four sections, each of which can lay 12½ miles of wire.

1,100 yards can be laid in 30 minutes if using bare wire, and in 15 minutes if using field cable.

A Divisional telegraph section, which is intended for use with reserve divisions, is half as strong as a Corps section, but has the same equipment. All sections carry either the Field Telegraph Apparatus 96, a Morse instrument similar to that used by the State telegraphs, or the Field Telephone.

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2nd Zone:—

In the 2nd Zone the lines of communication telegraph units do the work, and there is an Inspection Director in each line of communication. The equipment of lines of communication telegraph units consist of bare wire, poles, and insulating jars; and for its transport there is a detachment of A.S.C. under an officer.

1st Zone:—

The personnel in this zone, as in the last zone, consists of officials and employés of the State telegraphs.

TELEPHONES.

The field telephone "The Orderly," consists of a leather covered aluminium tube to which is attached a telephone for receiving, and a microphone for speaking purposes. If the microphone, owing to bad weather, or some other reason, will not work, then the sounder is used. This works in the same way as the Morse key, but the long and short induction currents (corresponding to the dashes and dots of the Morse alphabet) give at the telephone ("Artillery" Loud Speaker) at the receiving station, a loud monotone note of such force that it can be heard over the distances usually employed in the field, even though the insulation be incomplete, or even almost entirely wanting.

As the field telegraph apparatus works with the galvano electric currents, and the field telephone (microphone or sounder) with induction currents, it is possible to use both instruments simultaneously on the same wire.

WIRELESS TELEGRAPHY.

Wireless telegraphy is in the hands of the telegraph troops. A balloon or kite is used to elevate the network (40 feet by 4 feet) of wires of the apparatus.

The balloons are about 19 feet long, 5½ feet in diameter, with a volume of 350 cubic feet, sausage shaped with wings, and can lift 7lb. The kites are of calico or linen on frames and have an effective wind area of 12 square feet. The time required for erecting a station is 10 minutes. Printed records of the message can be obtained or the messages can be read by telephone.

With the recording instrument communication up to 62 miles can be maintained, while with the telephone receiver up to 124 miles.

Nine balloons and, it is believed, ten kites are carried by each section.

The war strength of a mobile Wireless Telegraph section consists of 2 Officers, 2 N.C.O's and 8 men. There are 28 Wireless Telegraph stations in Germany, one of which at Nauen has a range covering the whole of Europe.

Wireless telegraphy was employed in German South-West Africa, in the operations of 1903-5, and communication was satisfactorily maintained at 93 miles. Seven field Wireless Telegraph stations were in use, but lately the use of wireless telegraphy has been abandoned, and the equipment placed in store. This was due partly

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to the extensive use made of the Field Telegraphs, and partly to the deterioration of the wireless equipment, owing to warping of the woodwork and the damaging effect of sand on the instruments.

As to the proposed distribution of Wireless telegraph stations in war, nothing is yet known, according however to the arrangement at the Imperial manœuvres, it is supposed there will be a station with the Commander-in-Chiefs head quarters, the head quarters of each army, and with each cavalry division .

By means of mobile stations, wireless telegraphy has been made applicable for use in the field, and portable stations have been formed With mobile stations the balloon or kite always gives certain indications to the enemy. With the portable stations this very visible mark is wanting. Every portable station has a transmitter and a receiver which when in cases weigh 45lb and 33lb respectively.

For supporting the air line, when working the station, there are three masts of steel piping which telescope together into a length of four yards for travelling. When a station is established, these masts are drawn out to a length of about 11 yards, and erected in the shape of an equilateral triangle. Cast iron footplates and steel ropes in three directions, anchored in the ground, are used to hold the masts in position. Light and durable glass insulators are used for the insulation of the wire. The weight of a mast including rope and stays is 45 lb.

The current generator is either:—

(1). A small continuous current dynamo of 100 volts mounted on a bicycle. Weight 66 lb.

(2). A battery of 8 cells of 16 volts.

Time required to put up a station is 15 minutes. Range of transmission, about 15 to 30 miles. The station complete can be carried by three horses, by hand, or in one horse cart.

Total weight of station apparatus is:—

(1). With dynamo 5 cwt.

(2). With battery 5 cwt. 66 lb.

A wireless telegraph detachment (portable station) consists of 8 Officers, 100 N.C.O's and 40 horses.

Description of the Equipment.

The carts are six horsed wagons with limbers and consist of a power cart, apparatus cart, tool cart, and a store cart. On the top of the power cart there is a square box containing the tanks for water and benzine. The latter is used for driving the 4-h.p. benzine motor fitted beneath the box, while the water is required for cooling the motor. The apparatus cart carries the apparatus required for telegraphing, transmitter and receiver, battery etc. For connecting the power and apparatus carts a conductor cable is used.

The length of the aerial wire is 660 feet. When in use the latter end of the wire is fixed in a clamp, while the other end in calm weather is carried up by a balloon, or in windy weather by a kite.

The hauling in of the balloon is effected by means of a small clutch fixed to the power cart.

The tool cart carries both gas cylinders and stores, and the store

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cart holds 5 gas cylinders. The cylinders are permanently fixed to the cart and hold about 176 cubic feet of gas under a pressure of 120 atmospheres.

PORTABLE STATION.

The transmitter has:—

(a). Morse key fastened to side of case, which can be unhinged and worked.

(b). Induction coil with hammer interrupter and a primary, condenser.

(c). A battery of six jars (Leyden), and an exciting coil.

(d). Contact box for the aerial wire and counterweight with plug arrangement, that is to say, automatic interruption of the primary current by disconnecting the aerial wire and counterweight.

(e). Plug key for connecting up to the wires leading to the generating points of the currents.

The receiver consists of:—

(a). A sounder receiver.

(b). A double head telephone.

(c). A variable condenser.

(d). Four dry elements.

(e). A continuous current plug, that is to say, automatic interruption of the continuous current by disconnecting the aerial wire and counterweight.

(f). Contact box.

Aerial consists of tinned copper rope composed of 8·4 mm. strands twisted together.

The Dynamo:—

From the tread wheel, motion is conveyed to the dynamo by a rope, and specially constructed aluminium pulley. With the normal tread a 4 mm. spark is obtained on the indicator.

The Battery:—

Capacity of 30 ampere hours with 5 hour discharge. The strength of power it is possible to obtain exceeds that normally required by about 20%

The elements are in closed indiarubber cases which are distributed in two wooden cases. These are about 290 mm. high, 170 mm. wide, and 340 mm. long and weigh about 66 lb. each.

For working a station:—

(1). If hand dynamo is used, 10 men.

(2). If battery is used, 11 men.

This apparatus will be very advantageous for use in mountain and colonial warfare; with it, it will be possible to equip the several brigades of the cavalry divisions and the advanced guards with telegraphic instruments and to maintain communication with comparative reliability.

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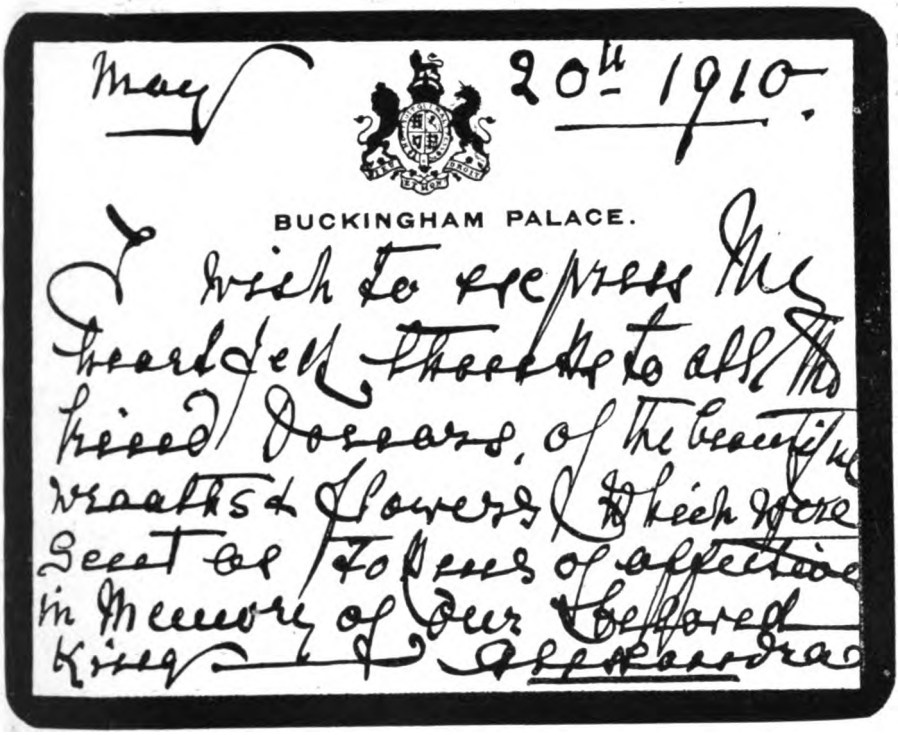

The above autograph letter has been received from Her Majesty Alexandra, the Queen Mother, thanking the Regiment for the Wreath sent to the Funeral of His Late Majesty King Edward VII., Colonel-in-Chief of the Royal Artillery.

The original letter will be framed and kept in the glass table in the R.A. Mess, Woolwich.

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HOME OFFICE,
WHITEHALL,
11th June, 1910.

My Lord,

I have the honour by direction of the Secretary of State to say that the Address of Condolence which you forwarded from the Officers, Non-Commissioned Officers and Men of the Royal Regiment of Artillery has been laid before Queen Alexandra, and that Her Majesty desires that you should convey to the Regiment Her heartfelt thanks for their sympathy in Her overwhelming sorrow.

I have the honour to be,
My Lord,
Your Lordship's obedient Servant,
EDWARD TROUP.

Field Marshal
the Right Honourable
Earl Roberts, K.G.,
Englemere,
Ascot, Berks.

NOTE.—The address of condolence was published in the June number.

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Thomas Graham—Lord Lynedoch.

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The Battle of Barrosa, March 5th, 1811.

(A lecture delivered at the Royal Artillery Institution, on Thursday, January 6th, 1910).

By CHARLES W. C. OMAN, Esq., F.B.A.

(Professor of Modern History, Oxford, and author of "A History of the Peninsular War").

Major General H. T. Arbuthnot, in the Chair.

THE CHAIRMAN: I regret very much that Colonel Townshend, who was to have presided here this evening, is prevented from coming. I have been asked at the eleventh hour to take his place. After the very interesting lecture on Albuera which Professor Oman gave us when he was last here, I feel certain that what he will tell us to-night will be equally interesting. I should like to draw attention to the attendance here to-night of a number of Officers and N.C.O's of the 87th Regiment, now the Royal Irish Fusiliers. Those of you who have read up the battle of Barrosa will know how that Regiment greatly distinguished themselves at that battle. These officers and N.C.O's have come here to-day to hear details from Professor Oman. It is an example, I hope, other Regiments will follow. In the name of the members of the R.A. Institution I offer the Officers and N.C. Officers of the Royal Irish Fusiliers a hearty welcome. With these few words of preface I will ask Professor Oman to proceed with his lecture. (Applause).

THE LECTURER: General Arbuthnot, ladies and gentlemen: When this year I was honoured by an invitation from the Royal Artillery Institution to speak once more on one of the battles of the Peninsular War, I ventured to select Barrosa as the topic of my lecture, partly because I chance to have looked through all the papers in the Paris War Office which bear upon it, partly because it forms a very important land-mark in the history of the great struggle between the British and the French tactical systems fought out between 1808 and 1814. Not being one of Wellington's own battles, it has always attracted less notice than the engagements of the great series which runs from Vimiero to Toulouse. It was also fought, not as a part of one of the main campaigns of the war, but on a sort of side-issue. Moreover, it was a victory which had no definite and immediate results, save of a negative kind. In this it resembles the still less remembered fight of Maida, on which I was speaking in

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1908. That is to say a great tactical success was followed by no strategical advantage. This came not (as at Maida) from the incapacity of the British commander, for Graham was a very fine soldier, but from external circumstances over which he had no control—you will presently appreciate the meaning of this phrase.

When I said that Barrosa was a great land-mark in the history of the Peninsular War, despite its lack of results, I meant that it was the first pitched battle during that struggle in which the British took the offensive, and showed that the system of line tactics which they had perfected was as effective for attack as for defence. All the preceding general engagements had been of a defensive type; alike at Vimiero, Corunna, Talavera, and Bussaco, the British army had taken up a favourable position, and waited to be attacked. The successful result of each demonstrated that the line tactics were admirable for defence. It remained to be demonstrated that they were equally profitable for attack. For Wellington's two previous experiments in offensive action, Roliça and Oporto, were too small in scale to give clear evidence on the point. It was a less known general than the Iron Duke who showed, on a battlefield far remote from the main theatre of war, that with every advantage against it—numbers, ground, and preparation—the two-deep line might be trusted to give a good account of itself. For here the smaller army, caught unexpectedly upon the march, fatigued by nineteen hours of tramping over midnight roads, turned about and rent the superior force that surprised it, attacking it uphill and in an improvised order of battle made up at three minutes notice. It was not only a conclusive triumph for the line on the offensive—the forerunner of Salamanca and Vittoria, but also a wonderful exhibition of the quickness and presence of mind of the old general who snatched victory out of the mouth of imminent destruction.

I wish that I could spare time to give you a detailed biography of that remarkable personage, Thomas Graham, afterwards Lord Lynedoch, whose great day was the fifth of March, 1811. He was one of the men to whom the struggle against France was a veritable crusade. His was an extraordinary career: He was a civilian, aged 44, when the French Revolution took its bloody turn in 1792. Moreover, he was a Whig member of Parliament, mainly known as a hard cross-country rider, and a keen sportsman (he played in the first recorded cricket match in Scotland in 1785). He was a considerable traveller, and knew not only French and Italian, like many other gentlemen who had made the *grand tour*, but German also—the rarest of accomplishments. Yet certainly if there had never been a French Revolution, he would mainly have been remembered as the husband of that most beautiful Mrs. Graham, whose portrait is one of Gainsborough's best known masterpieces.

Thomas Graham's introduction to the Revolution was horrible enough. His wife was stricken down with consumption in the winter of 1791-92; by the advice of the doctors he took her to the Riviera, but she died at Hyéres. The heart-broken husband was bearing her body home, across France, to be buried in the family tomb at Methven, just when the first wave of violence and blind rage caused by

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Brunswick's invasion was sweeping over the country. At Toulouse he was stopped by a drunken unruly mob of Municipal Guards and Volunteers, who insisted that he was smuggling arms for aristocrats in the coffin. They broke it open, while he was arrested for struggling to prevent the outrage, and was only released when the foul mob had gratified their curiosity. After this it can not be considered astonishing that Graham regarded it as the main duty of his life to shoot Jacobins. Despite his forty-four years, and his utter want of military training, it was his one desire to get to the front. At the outbreak of the war he served as a sort of volunteer aide-de-camp to Lord Mulgrave at the siege of Toulon, where he risked his life a thousand times. Then, early in 1794, he devoted all his available money to raising the 90th Foot, or Perthshire Volunteers, of which he became the honorary Colonel. He could not, of course, take command of it, but he went with it to the seat of the war in the Mediterranean, and was found so useful, owing to his gift of languages, that he was sent on a special mission to the Austrian army of Italy. He starved with Wurmser in Mantua, and froze in the Tyrolese Alps. From that time forward we find him wherever fighting was going on, in Sicily, Minorca, Malta, Egypt, Portugal, and Spain. It was many years before his honorary Colonelship was made into a substantive one—but at last it was done, as the reward of much valuable service, and in 1810, in return for his work in the Corunna campaign, he was given the command of the British troops at Cadiz, the 5000 men who formed the backbone of the garrison of the only fortress which still flew the Spanish flag in Andalusia, after all the disasters of the preceding winter.

I must not go into all the details of the Peninsular War—but you will remember that in the winter of 1810-11, when Masséna had been brought to a standstill before Wellington's Lines of Torres Vedras, Napoleon directed Marshal Soult, commanding the Army of Andalusia, to give help to Masséna. Soult, very unwillingly, drew off 20,000 men, and went in January, 1811, to attack Badajoz and Elvas, the fortresses that protected southern Portugal, and in a way covered Wellington's rear. To collect his field army he had withdrawn 4000 men from the corps under Marshal Victor that was besieging Cadiz, and only 16,000 were left facing that seagirt fortress. When this became known, the Spanish Government was anxious that an attempt should be made to raise the siege, by landing a force from Cadiz in the rear of the French lines, and calling in to its assistance the scattered bands which kept up a guerilla warfare in the mountains north of Gibraltar. Graham agreed eagerly with the scheme, and wrote General Campbell at Gibraltar, to ask him to lend what men he could from the garrison of that place and of the smaller fort of Tarifa, which was then maintained as a sort of dependency of Gibraltar. He received a favourable reply.

It was finally settled on February 18th that Graham should sail from Cadiz with all the troops under his command, save the battalion companies of the 47th Foot and the 20th Portuguese, and should pick up at Tarifa what small reinforcements General Campbell could spare him. He was to be accompanied by 7000 Spanish troops from the

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garrison of Cadiz—about four-sevenths of its disposable force, and they were to be joined after landing by an irregular force of some 2000 men under General Beguines, which was ranging the hills north of Gibraltar. The whole would amount to some 14,000 men, and the united army was to march against the rear of Victor's lines in front of Cadiz ,and to endeavour to break the blockade, either by fighting a general action, or by so manœuvring in the rear of the French as to compel them to draw far off from their lines in order to strike a blow at the allied army.

One cardinal fault was made in arranging the expedition: the command of the Spanish contingent was given to General Manuel La Peña, one of the senior officers present at Cadiz—a man with a talent for plausible talking and diplomacy, but one who had already shown himself a selfish commander and a disloyal colleague. This was the same man who, two years before, at the disastrous battle of Tudela, had ruined his chief, Castaños, by refusing to march to the sound of the guns, and contriving a safe retreat for his own 10,000 men, while the main army was being crushed only four miles away. Though not personally a coward, he was a shirker of responsibilities, and incapable of a swift and heroic decision. He treated Graham in March, 1811, just as he had treated Castaños in November, 1808.

Graham might have refused to put himself under the orders of La Peña, for he had discretionary authority from the British Government to refuse to act in any joint expedition in which he was not given the chief command. But anxious to bring matters to a head, and deceived by the plausibility of the Spanish General, he consented to place himself and his troops at the disposition of the contributor of the larger force to the expedition.

The English contingent sailed from Cadiz on February 21st, but was driven by foul winds past the difficult harbour of Tarifa, and only came ashore on the 23rd at Algesiras. Here Graham found waiting for him a light battalion which General Campbell had picked out from the garrison of Gibraltar.[1] From Algesiras he marched on the 24th to Tarifa, where he picked up another reinforcement provided by Campbell—the eight battalion companies of the 28th Foot, forming part of the garrison of that little fortress. Graham's whole force was thus swelled to 5196 officers and men, all British save the two light companies of the 20th Portuguese (330 men). He formed it into two small brigades, under General Dilkes and Colonel Wheatley —the former 1900, the latter 2633 strong.[2] The only cavalry was 206 men of the 2nd Hussars of the King's German Legion. There were ten guns under Major Duncan.

The Spanish contingent, which had sailed three days after Graham, had met the same rough weather as himself, but the vessels gradually dropped in upon the 26th and 27th, and on the 28th the allied army started on its march to attack Victor's rear. On arriving

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[1] **Flank companies of the 9th, 28th, and 82nd regiments, 536 bayonets.**

[2] **1st Brigade, 10 companies of guards 1,144 men, Browne's flank battalion from Gibraltar 536 men, 2 companies of 2/95th rifles.**

2nd Brigade, 1/28th, 2/67th, 2/87th, Barnard's flank battalion, two companies 20th Portuguese.

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at the bridge of Fascinas and the village of Bolonia, ten miles outside Tarifa, La Peña had to make up his mind whether he would march against the French lines by the road not far from the coast, which passes through Vejer de la Frontera, Conil, and Chiclana, or by the inland road through the mountains, which runs past Casasviejas to Medina Sidonia. The two roads at their bifurcation are separated by the long lagoon of La Janda, a muddy shallow sheet of water seven miles long, which nearly dries up in winter. But at this moment it was full to overflowing from spring rains.

La Peña had a great and misplaced belief in night marches, by which he always hoped to gain time on the enemy, and to obscure his position. He overlooked the corresponding disadvantages of the extreme slowness of progress over bad roads in rugged country, the very real danger that the troops (or some of them) might miss their way in the dark, and the inevitable fatigue to the men from losing their natural hours of sleep.

On reaching Casasviejas, after an exhausting march, the allies found the convent there occupied by a French post, which they succeeded in capturing—it was cut up by the German Hussars while it was attempting to escape. Here, too, Beguines and his 2000 men joined the army, according to the arrangement that had been made. But La Peña found from the prisoners that the next stage on his route, the little town of Medina Sidonia, was held by a serious force of French under General Cassagne—five battalions with a battery and a cavalry regiment, 2500 men, which Victor had sent out to cover his rear. The walls had been repaired, as it was reported, and the place was in a state of defence. It was probable that Victor himself would come up from Chiclana to reinforce this detached brigade if it were attacked.

Now La Peña as his previous record showed, was preeminently a shirker of responsibilities, and the prospect of a battle on the morrow, or the day after, seems to have paralyzed him. To the surprise of Graham—and of his own lieutenants—he gave the order that the army, waiting till dusk should have come on, was to leave the Medina Sidonia road, and to march across country by a bad bridle track to Vejer, on the coast route from Tarifa to Cadiz. Graham protested against a second night march, after the experience of the first—and rightly, for news came ere night that the path along the north bank of the Barbate river, which La Peña had intended to use, was absolutely under water from inundations. La Peña had perforce to consent to wait till next morning (March 3rd) and to use another country road, that between the north end of the La Janda lagoon and the river into which it falls. The army marched at dawn, the two Spanish divisions of Lardizabal and Anglona in front, the English force in the rear. But on reaching the intended crossing place, it was found that this road, like the other, was under water—the end of the La Janda had overflowed the flat country to the north, and covered the road. Graham, on arriving at the passage, found the Spaniards halted on the brink, and apparently at a nonplus. But the energetic old man took the affair out of La Peña's hands—he and his staff rode into the water, and sought personally for the track of

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the submerged path. They found it, and discovered that it was nowhere more than three feet below the flood. Graham placed his officers at intervals along the track, and sat on his horse in the middle of the ford, encouraging the troops as they marched past. "I set the example of going into the water" he remarks in his Diary, "which was followed by Lacy, the Prince of Anglona, and others. The passage took three hours, and would have taken double that time, but for the exertions we made to keep the files connected." It was 12 at night before the wet and draggled army reached Vejer, having taken fifteen hours to cover ten miles. From that town they drove out a picquet of French Dragoons—so that it was certain that Victor would next morning learn that there were allied troops on the coast road, and not on the inland road only, as had been reported to him on the previous day.

The French Marshal had now to make up his mind how to proceed. He had evidently a considerable Anglo-Spanish army on his hands, and it was not quite certain how it was distributed, for Cassagne reported on the night of the 4th that there were still troops in front of him—and this was true, for La Peña had left one of Beguines' battalions and some guerilla horse on the Medina Sidonia road.

But there was also the garrison of Cadiz to be watched, and it was showing signs of activity. On the night of the 2nd—3rd, when the field army was lying at Casasviejas, General Zayas, commanding in Cadiz, had (in accordance with a scheme of times left him by La Peña), thrown a bridge of boats over the Santi Petri creek, the broad water which separates the Cadiz Peninsula and the Isle of Leon from the mainland. He passed a battalion across it, which entrenched itself on the mud flat opposite, and threw up a strong tête-du-pont, under the protection of heavy guns on the Cadiz side of the water. This movement seemed to show that a sortie from the fortress was to accompany the movement of the field army. Victor resolved to stop it; on the night of the 3rd—4th he sent six companies of picked *voltigeurs* against the tête-du-pont, and stormed it in the dark. The battalion in the work (Ordenes Militares) was nearly annihilated, losing 13 officers and 300 men. And the bridge itself was only saved by the prompt sinking of two of its boats. Zayas floated the rest back to his own side, and laid them up for future use. They were to prove very serviceable on the 5th.

Putting together Zayas' movements, and the fact that some at least of the allied field army was now on the coast road at Vejer, Victor drew the correct deduction that La Peña was intending to get into communication with Cadiz. He made a new plan to suit the hypothesis. Of the three divisions of the 1st Corps, one, that of Villatte, was to block the neck of the peninsula between the sea and the Almanza Creek, by which the coast road leads to the Isle of Leon and the town of Cadiz. The other two, those of Ruffin and Leval, concentrated at Chiclana, were to wait till the allied field army found itself blocked in front by Villatte, and then to fall upon its flank, in the space of three miles that lies between the hill of Barrosa and the position which Villatte was to take up. This scheme would place

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the intercepting division in obvious danger, since when attacked in front by the advanced-guard of the advancing allies, it might find Zayas once more attempting to lay his bridge and molest its rear. But the Marshal directed Villatte not to fight to the last, but only to delay the Anglo-Spaniards long enough to enable him to fall on their flank with the other two divisions. The sound of his guns would be the signal for them to march out from their cover in the woods of Chiclana, and dash at the long columns strung out upon the road by the shore. Meanwhile orders were sent to Cassagne at Medina Sidonia, to find out exactly what was in front of him, and if the troops at Casasviejas turned out to be a mere detachment, to return at once to Chiclana and join the main body. He must have received this order somewhere in the afternoon of the 4th March.

The three divisions were none of them large, as they had each either left some battalions in the Lines, or sent some to Cassagne. Only 10,000 men were available for the fight with La Peña and Graham, unless the Medina Sidonia force came back earlier than could be expected with any probability. Of these 10,000 men, 3000 belonged to Ruffin's division, 3800 to Leval's, 2500 to Villatte's[1]; the balance was made up by the cavalry, of whom Victor kept one regiment (400 sabres) to himself, and gave the other (300 sabres) to Villatte. Each division had also its own field battery with it. On the evening of the 4th Ruffin and Leval were in the wood of Chiclana, Villatte on the ridge of the Torre Bermeja, blocking the road from Vejer to Cadiz.

On the next morning the allies, after another of the night marches in which La Peña delighted—it lasted 14 hours and only covered 14 miles—were with the head of their column—Lardizabal's division—under the heights of Barrosa, below the rising ground that the Spaniards call the Cerro del Puerco—the Boars Hill—which looks out northward over the heathy plain as far as the woods of Chiclana, and westward across a low pine forest towards the Santi Petri and the Isle of Leon. The cavalry of the advance guard had found no enemy on the heights or in the plain, but presently brought back news that they had discovered a French force ahead, across the high road, between the Almanza Creek and the sea, blocking the way to Cadiz. It seemed to be a strong brigade, with a squadron or two of horse. This was of course Villatte, waiting for the appearance of the allied army.

La Peña informed Graham, that despite of the fact that the men were tired from their long night march, he intended to thrust this French force out of the way without a moment's delay. Lardizabal and the vanguard were to attack it at once, while the rest of the army took up a position to cover him from any possible movement of the

[1] Leval had six battalions—two of the 8th, two of the 54th, one of the 45th, one a provisional battalion of grenadiers. The other battalion of the 45th was in the Lines. Ruffin had one battalion of the 9th Léger, two of the 26th line, one of the 96th line, two of grenadiers. He had lent one battalion to Cassagne, and had another in the Lines. Finally Villatte had only five battalions, two of the 95th line, two of the 27th Léger, one of the 94th line. He had lent two battalions to Cassagne.

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enemy from the direction of Chiclana. Accordingly Anglona followed Lardizabal, in support, while Graham and the British division and Beguines' brigade of Spaniards took possession of the height of the Cerro del Puerco. The cavalry, the 200 German Hussars and Whittingham's 600 Spanish sabres, remained as rear guard, on the high road eastward from the Cerro.

About nine o'clock in the morning, Lardizabal with his five battalions reached Villatte's front, deployed, and attacked him. The forces were about equal, and the Spaniards were repulsed, with some loss. La Peña then ordered up the leading brigade of Anglona's division to renew the attack. A sharp encounter was going on when a new fire broke out behind Villatte. Zayas, from the Isle of Leon, had re-cast his bridge across the Santi Petri water, and was advancing to take the French in the rear. Villatte saw his danger, gave up his position across the peninsula, and hastily fell back towards the passage of the shallow Almanza Creek, which he re-crossed not without some difficulty, and then drew up to defend the crossing. Lardizabal was prevented by La Peña from pursuing him, and halted on the nearer side of the Almanza. The skirmish had been hot—Villatte lost 337 men, the Spaniards a few more. But they had achieved their purpose and the communications with Cadiz had been opened.

So far all had gone well for the allies. It is clear that Victor had failed to carry out his plan—he had been too late in coming up to Villatte's aid. Apparently the reasons that had kept him back were, firstly, that he had overrated the time that his lieutenant would be able to hold on in the strong position that he had chosen for him, secondly, that he hoped to have Cassagne arriving from Medina Sidonia in the early morning, and waited over long for him, but most of all that he could see the heights of Barrosa well occupied by Graham's division, and did not wish to have to attack the allied centre while there was a powerful column on the hill, which would have been able to descend upon his flank.

About two hours after the skirmish with Villatte was over, Graham received orders from La Peña to evacuate the Cerro del Puerco, and draw in to join the rest of the army on the Almanza Creek. Meanwhile he was to be relieved on the hill by Beguines' brigade of three battalions, and by two other Spanish regiments under Colonel Cruz Murgeon which had been attached to the British division. These were to withdraw in their turn, when they saw that Graham had safely joined the main body. Graham entirely disagreed with this movement; if the allies evacuated the Cerro, and crowded themselves into the narrow peninsula between the sea and the Almanza, there was nothing to prevent Victor from seizing the Barrosa heights, and placing himself across the rear of the allies, in a way which would block them once more into Cadiz, unless they chose to come out and attack him in a formidable defensive position. So all the results of this toilsome march from Tarifa would be sacrificed. The English General had urged on La Peña at an early hour of the morning that it was all important to hold the Cerro, but now saw that his advice was rejected. Obeying orders, however, he descended

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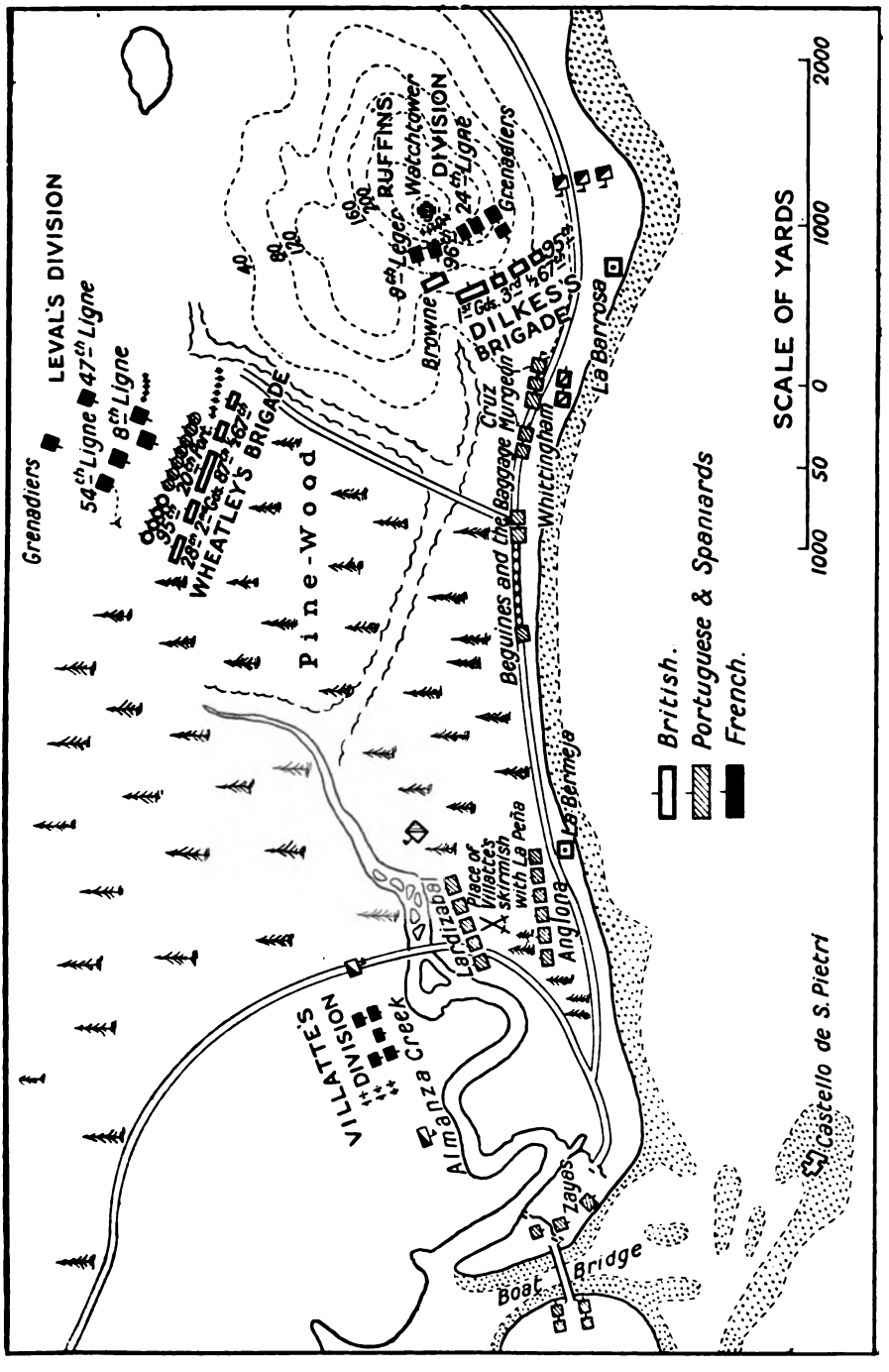
BATTLE OF BARROSA.



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from the hill and began his march towards the main body. He took the precaution, however, of leaving one battalion—Browne's flank companies from Gibraltar—upon the position, to co-operate with the Spanish brigade on which the rear-guard duty was now thrown. The marching column of Graham's division did not descend to the coast road, but came down the Cerro on its western side, and plunged into a fair wood-path through the middle of the pine forest which covers the whole flat between the hill and the Almanza Creek. This short cut saved a mile of counter marching, and was quite practicable even for artillery.

At this moment, somewhere about noon, Victor suddenly broke out of the forest of Chiclana with 7000 men of Ruffin's and Leval's divisions. He was tired of waiting for Cassagne, who (as he had just heard) had started very late in the morning, and was still many miles away. His scouts had just reported to him that they had seen the English descend from the Cerro, and had not noticed the Spaniards of Beguines climbing it from the sea side at the same moment that Graham came down its other front. Since great part of the allied army had been located opposite Villatte, it seemed likely that the rest would be caught defiling across the front of the advancing French, either through the wood or along the coast road. The Marshal's orders sent his one cavalry regiment (the three squadrons of the 1st Dragoons), to turn the height of Barrosa on its eastern side, and seize the coast road, while Ruffin ascended the Cerro by its gently sloping northern side, and Leval struck at the troops known to be in the wood. The French came on at a great pace, being quite fresh; and the Marshal had explained to his lieutenants that haste was all important, in order to catch the allies as they marched past his front. The moment that Victor emerged from the Chiclana forest his two columns were clearly visible to observers on the Barrosa heights, but neither Graham in the wood-path, nor La Peña down by the low ground of the Almanza Creek could descry them.

A very heavy responsibility now fell on the officers upon the Cerro—Beguines, Cruz Murgeon, and Colonel Browne, who were soon joined on the crest by Whittingham, the cavalry commander, who had also his responsibilities with regard to the covering of the rear. They had La Peña's orders to evacuate the heights so soon as Graham should have got well upon his way toward the main body. But they had no instructions what to do if they were themselves attacked, while just taking up their positions. They might have attempted to hold the Cerro, with the five Spanish and one British battalion at their disposal, or they might simply obey orders blindly, and retire upon the main body, abandoning the dominating ground on which they had just arrived. Browne was all for fighting; but the other three overruled him; the main responsibility for the retreat seems to have rested upon Whittingham, as his despatch to La Peña shows. He writes "the enemy were advancing in two strong columns, one marching directly upon my position, the other extending itself for the purpose of outflanking us. A third body was approaching the pine wood between my position and that of the army, the only route by which I could carry out the movement of retreat ordered.

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I therefore ordered the infantry to retire, covered by my cavalry." The five battalions of Spaniards streamed down the south-west face of the hill in no very good order, and fell in there with the baggage of the army, which was on the section of the coast road on to which they descended. There was much disorder, and many of the baggage mules got loose and bolted. Meanwhile Whittingham ranged his cavalry across the coast road to cover the retreat, and soon found himself faced by the regiment of French dragoons, which had ridden round the hill with remarkable celerity. Browne with his light battalion lingered on the hill for half an hour after Beguines had disappeared, and only retreated when he saw Ruffin's six battalions coming rapidly upon him, and no other allied troops near. He then retired downhill towards the pine wood.

Meanwhile we must return to Graham, concealed among the pines, and marching, as it were blindfold, across the front of Leval's approaching division. The French were well started before he got the news of their advance from some guerilla scouts. Riding to the rear of his division, where the trees grew sparse, he plainly saw Beguines' and Cruz Murgeon's troops pouring down the near side of the Cerro, and Ruffin's mounting its northern ascent, while he also became aware of the nearer and more threatening advance of Leval against his flank.

The old General's mind was made up in a moment. "A retreat in the face of an enemy," he writes, " who was already in reach of the easy communication by the sea-beach, must have involved the whole army in the danger of being attacked during the unavoidable confusion when the different corps would be arriving on the narrow ridge of Bermeja at the same time," *i. e.*, he saw that he himself coming out of the wood, Whittingham and Beguines from the shore road, and the main body returning from the Almanza Creek fords, would meet in disorder on the narrow neck of the peninsula, by the Torre Bermeja, and would be unable to form any compact line of battle. Even if they did, and then held their ground, the object of the whole expedition was lost, and the French, in possession of the Cerro del Puerco, once more blocked the army into Cadiz.

The alternative was to take the offensive before the two French columns had united, and to attack them while they were still coming upon the ground, and before they had drawn up in any regular order. It was evident that they were hurrying forward without any notion that they were liable to be thrown on the defensive at a moment's notice. In three minutes Graham had made up his mind to attack himself, instead of allowing himself to be chased into the Bermeja position. The wood in which his division lay concealed enabled him to hide his movement, though it made that movement perilously disorderly. The orders given were simple; the leading brigade, that of Colonel Wheatley, was to push straight through the wood till it reached the northern edge, and then form there, and attack Leval. The rear brigade, that of General Dilkes, was to counter-march down the wood path on which it was engaged, till it too cleared the wood, and then to form up and attack Ruffin on the slopes of the Cerro del Puerco. The ten guns, in the centre of the marching column, were

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to push up a side track which seemed passable, and to form on Wheatley's right, in the centre between the two brigades. Meanwhile these movements would take some time to execute, and the French were coming closer to the wood every minute. It was necessary to hold them back at all costs till a line could be formed. With this object Graham resolved to throw forward on each front a light infantry force, which should engage the enemy, regardless of order, and of losses, till the main body got up. On the left Barnard's four companies of the 95th rifles and the two companies of the 20th Portuguese under Colonel Bushe, about 700 men in all, were ordered to break through the wood directly before them, without any attempt at formation, and, when they reached its edge, to sally straight out at Leval's front in the best skirmishing line they could make. On the right there was a force already to the front, Browne's flank battalion, 536 muskets, which had just descended unwillingly from the Cerro, and was visible at its foot.

This last force was near Graham as he sat on his horse among the trees at the road's end. He cantered up to Browne, and asked him why the Cerro had been abandoned, "Because five battalions of Spaniards went off before the enemy came within cannon-shot," was the reply. "Well it's a bad business Browne: you must instantly turn round again and attack." The flank battalion began to extend into skirmishing order, when Graham, after a moment's reflection said "I must show something more serious than skirmishing, close the men into compact battalion." And then "attack in your front and immediately." Dilkes' brigade was coming up, but was still a mile away in the wood, and Browne issued out of the trees into the open, absolutely isolated, to attack uphill six battalions and a battery with a two-deep line of just 536 men.[1] Blakeney says that his Colonel rode into action singing the old naval song

"Now cheer up, my lads, 'tis to Glory we steer,"

a tune to which he was much addicted at all times, in and out of season.

About the same time, or a few minutes later, Barnard's and Bushe's scattered and uneven line burst out of the northern edge of the wood a mile away, and found themselves facing Leval's division at the distance of only some four hundred yards. This force, quite unaware that any enemy was yet near, was advancing in two columns each of three battalions, the right one composed of the 54th regiment and a battalion of *grenadiers réunis*, the left of the 8th regiment followed by a single battalion of the 45th. Their divisional battery was following on their left rear. Barnard, who got a little further to the front than the Portuguese, was facing the French 54th. Bushe, who was drawn back a little in échelon, was opposite the French 8th. They had hardly opened their fire, which had great effect because the enemy had no screen of voltigeurs out to cover him, and was caught unprepared for an infantry fight, when Duncan's ten guns, which had made extraordinary good pace through the wood, appeared,

[1] All this from the graphic description in the autobiography of Blakeney, Browne's Adjutant, p. 188.

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and, unlimbering at its edge, began to fire shrapnel into the leading battalions of the French. Behind them the two companies of the 47th, which properly belonged to Barnard's provisional battalion, took post as their supports.

Thus the battle was suddenly begun on both fronts, but Graham had only 500 men up on one side, and 900 with the guns on the other. The main body was coming on through the wood behind, in an extraordinarily mixed order. When Graham gave orders to Wheatley's brigade to face to their left flank and push through the wood northward, and to Dilkes' brigade to turn about on the road and return to the Cerro by the way they had come, there was no small confusion. By some misunderstanding the rear companies of the 67th, which was the last battalion in Wheatley's brigade, faced about and followed Dilkes, though the leading companies went off with their proper companions the 28th and 87th. On the other hand, by a compensating mistake, the two companies of the Coldstream Guards, which belonged to Dilkes, turned north into the wood, and followed Wheatley.[1] The brigades exchanged, as it were, 250 men with each other.

But while this line was being formed, the screen of light troops which Graham had thrown forward to detain the enemy had done its duty, by suffering itself to be knocked to pieces while attacking fivefold numbers. It had been sacrificed to gain time, but had gallantly carried out its orders. We will take the fortunes of the right hand force first.

Browne's composite battalion had started from a position close under the edge of the pine wood; it had first to cross a broad but shallow ravine, and then to climb the gentle slope of the Cerro, where it became fully visible to the enemy, though there was a little cover here and there upon the hill side, in the form of scattered bushes and slight dips in the ground. The French allowed the line to advance a little way up the ascent, and then opened upon it with a field battery placed close to the chapel on the summit, and with the musketry fire of the three battalions which formed their right wing. Blakeney, our ever-useful authority for this side of the battle, says that the first salvo of the French knocked over more than 200 officers and men out of 536 forming the line. Browne ordered the men to close to the centre, and endeavoured to continue the climb; this was done with much difficulty, but before the advance could be resumed more than fifty more were killed or wounded. All the exertions of the Colonel could not form a third line—fourteen officers out of twenty-one were down, and more than half the rank and file. The remainder now scattered; the men did not retreat, but threw themselves down, and commenced independent firing from behind bushes, hillocks, and any other cover they could find. The French made no attempt to fall upon them by descending the hill, as would have seemed natural. The reason was that by the time that the flank battalion had been disposed of, the main body of Dilkes' brigade had come out of the wood, and was visible forming up at the foot of the hill to deliver the real assault.

[1] The Biography of Dilkes shows how this came about. Duncan, the artillery commander, thinking that no infantry support had been allotted to him, asked Col. Jackson, of the Coldstream, to cover him, and the latter consented.

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The Guards had obtained the necessary time to come up and choose their ground, through the absolute martyrdom of the flank battalion. Dilkes did not repeat the attack on the same slope over which Browne had advanced, but pushed some distance to his right, where the hill side showed more cover in the way of scattered bushes and trees, and some dead ground, protected by its steepness from the fire of the battery on the crest of the hill. Blakeney describes the Guards as strung out on a most irregular front, a confused mass rather than a formed line. The whole, while advancing, kept taking ground to their right, so as to come up the hillside opposite Ruffin's left wing. Their extreme flank was covered by Norcott's two companies of rifles in more extended order. Partly owing to the cover, partly to the difficulty found by the French guns in getting their fire to bear, Dilkes' brigade got well-nigh to the top of the hill before it suffered any very serious losses. But on clearing the last underwood, and reaching smooth ground, it was charged by the four battalions of Ruffin's left—two of the 24th Line supported by the two reserve battalions of *Grénadiers Réunis*. This was the crisis of the battle in the southern half of its progress. By all the rules of French military art four battalion columns, fresh and well ordered, charging down hill, should have been able to break through a disordered line of decidedly inferior strength pushing upwards against them. Dilkes had only 1400 men—the four French battalions just over 2000. Nevertheless the impossible happened. When the two columns of the 24th Ligne came down, with drums beating and levelled bayonets, against the centre of the firm, if disorderly, line in front, they were checked by the furious fire that broke out against them from the semi-circle into which they had pushed. This was one more example of the fact established at Maida five years before, and re affirmed at Vimiero, Talavera, and Busaco, that no column could break the British line by mere impetus. In this case the French had every advantage, since they were absolutely intact troops, and had the ground entirely in their favour, while the Guards and the wing of the 67th opposed to them had marched two miles in haste, had then climbed a steep 200 foot slope, under fire, had lost their order, and were firing up hill. But the fire was delivered with astounding accuracy, considering that the men were blown with their climb, and dreadfully exhausted. The whole head of each of the descending columns was blown to pieces. The rest came to a standstill, and crowding together in a disorderly clump, opened an irregular fire against the British line.

The Marshal, who was present himself on the top of the Cerro, then brought up his reserve, the two battalions of Grenadiers under General Chaudron Rousseau. He himself and the brigadier were both distinctly seen leading on the column, the Marshal waving his large white-plumed hat over his head. This charge was delivered against the right of Dilkes' line, where the 3rd Guards and wing of the 67th lay—that of the 24th line had been more against the centre and the 1st Guards. But the result was the same, though the struggle was more long and bloody. The Grenadiers are said to have struggled forward, losing heavily at each step, till their front was within a very

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few yards of Dilkes' line; it was only then that they halted, and began to fire—a fatal step in such a contest, where impetus was the sole chance of the attacking mass, and superiority in musketry fire (owing to the larger front) was on the side of the English line. This, of course, was a terribly murderous business to both sides—as the figures presently to be quoted will show. But, as in all similar contests during the Peninsular War, the line hit harder than the column. The four French battalions began at last to give way, and could not be brought up when Victor tried to bring in the two left battalions of his line to their aid, for these two units were pestered and impeded, when they began to move off from their first position, by the remains of Browne's flank battalion, which (though reduced to under 300 muskets) began to press forward again, when the troops, hitherto in their front, commenced to move off to the right. "They darted from behind trees, briars, brakes, and out of hollows," says Blakeney. I could imagine myself like Roderick Dhu upon Benledi's side—it was a magic effect. We confidently advanced up the hill, and, unlike most advances, in this one our numbers increased as we proceeded, soldiers of the flank battalion joining at every step." This scattered little force hung on to the flank of Victor's right, and prevented it from rallying the broken force now recoiling from in front of Dilkes. The flankers had even the good fortune to capture a howitzer from the left of Victor's battery placed by the chapel on the hill top; another gun was taken by the 1st Guards in their forward progress.

It must have been at this moment that the whole French mass broke—up to this moment it had been recoiling sullenly, still keeping up some fire from its rear. But now the observer saw[1] "with loud and murmuring sounds, Ruffin's division and Rousseau's chosen grenadiers rolling with a whirling motion down into the valley below, leaving their two brave generals mortally wounded on the hill, which was left in possession of their bloodstained conquerers."

The exhausted victors halted for a short time to reform, and were in a more orderly line than they had hitherto shown when they commenced to follow the enemy down the slope. The casualties in this part of the field may now be stated, for neither party was to lose many more men in the last episode of the fight. Dilkes' brigade and Browne's flank battalion had gone up the hill with 76 officers and 1873 men. They lost 25 officers and 588 men—about 10 men out of every 31 in the fight. The French loss was positively more—proportionately not quite so great. In the six battalions of Ruffin and Chaudran Rousseau there seems to have been about 108 officers and 3000 men present; of these 36 officers and 840 men were left on the hill, *i. e.*, 10 men in every 35. The trophies remaining with the victors were two guns and 106 unwounded prisoners, beside the hundreds of disabled men left on their backs.

While this bloody business had been going on upon the Cerro del Puerco, it may be asked what were the Spaniards on the coast road doing—Whittingham's squadrons and the five battalions of Cruz Murgeon and Beguines. The last named, with his three battalions, shepherding what was left of the baggage train, quietly marched off

[1] **Blakeney, p. 195.**

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along the sea, and joined La Peña by the Torre Bermeja. Whittingham was of a little positive use—he continued all through the fight to bicker with the French cavalry regiment (1st Dragoons) that faced him near the Torre Barrosa. The two battalions of Cruz Murgeon supported him. This force certainly did not do its share—180 German Hussars, 600 Spanish horse, and 1000 Spanish foot, simply kept out of action 400 French horse. This was something, but not much, for the Dragoons could not have interfered very effectively on the hill against Dilkes' advance, because the south side of the Cerro is too precipitous for horsemen. In short, Whittingham's statement in his report to La Peña, that " all the cavalry fulfilled its duty brilliantly " is a sad overstatement of the case.

Let us turn now to the other half of the fight, where Wheatley's brigade and Duncan's guns were facing Leval on the open plain just outside the edge of the wood. At the moment when Browne attacked the Cerro, Barnard's Rifles and Bushe's Portuguese were throwing themselves in no less resolute fashion upon the six French battalions in their front, and they had the advantage of being invisible to the enemy till they emerged from the wood only 300 yards in his front, and of being supported within a few minutes of their arrival by Duncan's ten guns, while Browne had no artillery assistance whatever, and been seen by the French for half a mile before he got near them.

The confusion in Leval's division at being suddenly attacked by an unexpected swarm of skirmishers pouring out of the wood was extreme. So much were they taken aback, that Vigo Roussillon of the 8th Line assures us in his memoirs that a false alarm of cavalry was raised, and that his regiment and the first battalion of the 54th formed square before the mistake was recognised, and caught some shells from Duncan's guns in that uncomfortable formation ere they had time to reform for action against infantry. This they had to do under a heavy fire from Barnard's riflemen, who had advanced quite close to them. Their fighting formation was the usual "column of divisions," *i. e.*, a front of two companies and a depth of three in each battalion, or (since these units averaged 650 men each, and the companies over 100 bayonets) a front of seventy-two men and a depth of nine. The front of Barnard's skirmishing line with his 400 Rifles seems to have covered the front of the right battalion of the 54th and the left battalion of the 8th—some 1300 men. The 95th did considerable execution on them while they were forming up, but when the columns advanced firing, the skirmishing line had to fall back—their loss was heavy, 65 killed and wounded—among the latter Barnard, commanding the battalion. The next troops whom the French encountered were the flank companies of the 20th Portuguese —330 men only, who had advanced to the right rear of the 95th, supporting them in échelon. This was a new corps, which had been sent to Cadiz the moment it was raised in 1809, and had never been under fire before. Considering their hopeless position, alone in front of an advancing division, the Portuguese behaved very well; they held their ground for some time, while their Colonel Bushe, as is recorded by an eye-witness, rode slowly backward and forward behind them with his spectacles on, crying as the balls whistled past

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"Que bella musica" to encourage his men. But he was soon mortally wounded,[1] and after his fall the line melted away and drifted to the rear, after having kept a battalion of the French 8th engaged for some minutes; proportionally their loss was much the same as that of the Rifles—56 killed and wounded out of 332 present—one in six.

The first act of the drama on this front was thus complete, the detaining force sent out by Graham had been, as he expected, driven in with loss—though not an appalling loss of 50 per cent., such as Browne's gallant flankers had suffered on the Cerro. But the main body was now up, and had formed in the edge of the wood, to the left of Duncan's guns, with no loss or interruption, since they had been well covered all the time. There were now some 1400 of them in line—the 28th, 450 strong on the left, then the 211 bayonets of the Coldstreamers, the 87th, nearly 700 strong, in the centre, beyond them the right wing of the 67th, about 250 bayonets, next to the guns, which were still under the protection of the two companies of the 47th, which served as their escort throughout the fight. The broken companies of light troops which had just retired were by no means out of action; the 95th formed up again behind the 28th, the Portuguese behind the 87th, and both were used again before the battle was over.

The formation of the French at this moment was in an uneven line of four battalion columns, counting from their left 1/8th, 2/8th, 2/54th, 1 54th; the other two battalions were in reserve, the 1/45th behind the French battery, which was now engaged with Duncan's guns, the provisional battalion of grenadiers more to the west, and some distance behind the 54th regiment. The whole was advancing, but slowly, the battalions in the front line all firing; the centre was a little more to the front than the wings, the 2/8th being ahead of the other battalions because (as its *chef de bataillon* remarks in his memoirs) he only allowed his men to fire volleys by order, while the units on his right and left were using independent fire. All had suffered in the previous fight with Barnard and the Portuguese, and much needed time to reform, which was not granted them, because the English main line charged the moment that the light troops had cleared off from their front. It is curious to note in the French memoirs that the authors all write as if they had an oppressive feeling that the superiority of numbers was against them, and that they were being led to a forlorn hope. This was caused partly by the immense extent of the British line in proportion to its depth, still more by the happy existence of the wood behind Wheatley's brigade. It had already vomited out two lively attacking lines, and the enemy presupposed a third in reserve; nearly all the French narratives definitely say that they were attacked by three lines, while really there was only one, with the screen of light troops which had already been used up. As to the complaint concerning inferior numbers, it is certain that

[1] Vigo Roussillon says that he personally captured Colonel Bushe, who was riding away slowly from the front, disabled by a wound. This seems contradicted by the very circumstantial narrative of Bunbury, Adjutant of the 20th Portuguese, who says that Bushe declined to be sent to the rear, and was propped up and left behind by his own orders. French soldiers were seen rifling him as he lay.

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Leval's division had 3800 men, and Wheatley's command only 2800. The sole superiority of the British was that in the artillery duel now going on to the right of the line, they had ten guns to six, and had crushed the French battery, so that it gave no effective support to its infantry. Only one of the French battalions attempted to deploy into line—this was the 2nd of the 54th, which lay opposite the British 28th—the others kept on from first to last in column of divisions. An eye-witness (Surtees of the 95th) remarks "they never got into line, nor did they ever intend to do so, I believe, but advanced in solid bodies, firing from their front." [1]

The fight, owing to the French centre being slightly advanced, began a little earlier here than on the wings—the first clash being between the column of the French 2/8th, and the line of the 2nd battalion Royal Irish Fusiliers, led by that enthusiastic fighter, Major Gough. We have the narratives of both of them, and each insists that he kept down the fire of his men till they were within a very short distance of the enemy—sixty yards says Vigo Roussillon, twenty-five says Gough. There was then a single volley exchanged, and the French column, much the harder hit of the two, broke up. "As they were in column when they broke," says Gough, "they could not get away. It was, therefore, a scene of most dreadful carnage, and I must admit my weakness, as I was in front of the regiment I was in the very middle of them, and I could not cut down one, though I might have twenty, they seemed so confounded and confused." There was indeed a fearful crowding and melée here, for the 1st battalion of the French 8th, yielding before the fire of the British guns and of the troops to the right of Gough, the wing of the 67th, fell back sideways against their own 2nd battalion, and became mixed up in one mass with them. Thus the 87th were sweeping before them and ploughing through a crowd of some 1400—or, allowing for previous losses, 1200 men, while the companies of the 67th were firing into its flank and rear. The 8th Ligne suffered worse losses than any other troops on the field that day, save Browne's heroic flank battalion, losing full 50% of the men who went into action, 726 killed, wounded and taken out of 1468 present. The Colonel, Autié, was killed, and one of the two battalion chiefs, Lanusse, while the other, Vigo-Roussillon was wounded and taken prisoner. The eagle was captured from the middle of the 1st battalion after a desperate struggle with the colours guard; Ensign Keogh of the 87th, who first got hold of it, was twice bayonetted and killed; Sergeant Masterson[1] then ran the *aquilifére* through with his pike, and dragged the eagle away, and kept it during the rest of the melée. This was the first eagle captured by the British during the Peninsular War, and its arrival in London was rightly made an occasion of considerable pomp and ceremony. The eagle was presented to the Prince Regent in person, who granted to the 87th the right to bear an eagle and a laurel wreath above the harp on the regimental colours and appointments, and the title of the "Prince of Wales' Own Irish Regiment." Gough was given a Lieut.-

[1] Surtees "Twenty years in the Rifle Brigade," p. 119.

[1] A hereditary name of glory in the 87th. The present representative of the family won his Victoria Cross at Ladysmith, in 1900.

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Colonelcy at once, and Sergeant Masterson who had captured the eagle, received a commission in his own regiment; he and his descendants have served in it almost throughout the nineteenth century.

The rout of the 8th Ligne was not the last triumph of the 87th on that day; driving the remains of that unfortunate corps in front of them, they came upon the battalion of the 45th Ligne, which had hitherto been standing in reserve behind the French battery, and which Leval had just ordered up to support the broken first line. Gough, with the greatest difficulty, succeeded in forming about half his scattered, though victorious, regiment to face this new enemy. But there was hardly a collision—all the other French troops were broken by this time, and the 45th hesitated. "After firing until we came within about fifty paces of them," writes Gough, "they (fortunately for us) broke and fled, for had they done their duty, fatigued as my men were at the moment, they might have cut us to pieces. That this battalion can not have behaved well is sufficiently shown by its casualty list—out of 700 men present it only lost 55, far the smallest proportional loss in the whole French army that day. Probably the weakness of its resistance is partly to be accounted for by the fact that it was being out-flanked by the wing of the 67th, who must have been extending in this direction at the moment—prolonging the line of the 87th eastward. In its double victory the 87th lost 173 men out of 700 in the field.

There remains the left wing of this fight to be dealt with. Here the French 54th, in two battalion columns, were facing the British 1/28th. This was the only part of the field in which the French tried at all to manœuvre; the right battalion of the 54th began to deploy, and to turn the British flank by moving westward into the edge of the pine wood, but with little effect. We have a short account of this fight in the memoirs of Cadell of the 28th.

"We had formed line under cover of the 95th, and then advanced to meet their right wing, which was coming down in close column —a great advantage—and here the coolness of Colonel Belson was conspicuous—he moved us up without firing a shot, close to their right battalion, which just then began to deploy. The Colonel then gave the orders to fire by platoons from centre to flanks, and low, "fire at their legs and spoil their dancing." This was kept up for a short time, with dreadful effect. The action being now general all along the line, we twice attempted to charge. But the enemy, being double our strength, (since our flank companies were away), only retired a little on each occasion. Finally giving three cheers we charged a third time, and succeeded, the enemy gave way and fled in every direction."

Of all Leval's division there now remained unbroken only the single battalion of *grénadiers réunis* under Colonel Meunier behind his right rear. The routed 54th fled sideways to take cover behind it. Belson did not pursue very rapidly—and this wing of the beaten division moved off diagonally, covered by the grenadiers, and presently met the 8th and 45th not far north of the Laguna del Puerco, the pool shown on the eastern edge of our battle-plan. It may not be out of place to give its losses,—the 45th with 1300 men present lost

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323—about one man in four. The grenadiers hardly suffered at all, never having come into close action. Of the British opposite them the 28th with 450 men in the field had 86 casualties, the Coldstream companies lost 58 out of 211.

Just as Leval's division arrived near the Laguna, it was joined by the wrecks of Ruffin's, descending in disorder from the northern slope of the Cerro. It says much for the resolution of Victor that he succeeding in halting the two disorganised masses, and deployed two or three comparatively intact battalions and the 8 guns which remained to him, to cover the rallying of the rest. At the same moment his cavalry, the 1st Dragoons, which had galloped away round the east side of the Cerro when Ruffin was beaten off it, came in and drew up on the right and left of the whole. It was a bold bid to secure an unmolested retreat, for no more could be hoped. Some time was available for rallying the troops, for Graham had also to get his exhausted men in order. They came up at last, Wheatley's brigade on the left, Dilkes' on the right, the guns in the centre. The latter were set to play on the new front of the French, which they did with great effect, the enemy being in a cramped mass. The skirmishers went forward, and a third separate engagement seemed about to begin, when a small new force intervened. This was one of the two squadrons of the German Hussars, which had followed the French Dragoons around the back of the Cerro, not on the order of Whittingham, who made no haste to follow, but on those of Graham's aide-de-camp Ponsonby, who had carried them off on his own responsibility. Coming like a whirlwind across the lower slope of the hill, this squadron upset the French squadron of the 1st Dragoons which formed Victor's flank guard on this side, and drove it in upon the infantry. Small though the shock was, it sufficed to upset the equilibrium of the demoralized French battalions. They went off in a sudden rush, leaving behind them two more guns, and streamed across the plain towards Chiclana.

The battle was over—there was no pursuit, for the cautious Whittingham came up ten minutes too late with the rest of the cavalry, in time to see the last of the enemy disappearing in the woods. With him came up also the two infantry battalions under Cruz Murgeon, and these were the only Spanish troops that Graham saw during the battle.

It may be noted that we have hitherto not had occasion to say one word of La Peña, or his two infantry divisions, since the main action began. On being informed, at the same time as Graham, of the approach of Victor from Chiclana, La Peña had no thought save to defend the isthmus by the Torre Bermeja against the approaching enemy. He drew up his own eleven battalions across it in a double or treble line, while Zayas, with those which had come out of Cadiz, watched Villatte across the Almanza Creek. When Beguines came up from the Cerro by the coast road, he was put into the same mass, which must have risen to something like 10,000 men. Presently news came from the wood that Graham had faced about and was fighting the French. La Peña, as his own dispatch shows, concluded that the English must inevitably be beaten, and refused to stir a man to sup-

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port them or to bring them off. Zayas repeatedly asked permission to march to join Wheatley's flank, or to cross the Almanza and to attack Villatte, but was refused leave. The first report to the effect that Graham was driving the French back, La Peña refused to believe. It was not till the fugitives of Leval's division were seen retreating past the head of the Almanza that La Peña could be got to credit the idea that Graham was victorious. And when pressed to join in the pursuit by Zayas, he merely said that the men were tired, and the day far spent. The reaping of the fruits of victory might be left for the morrow.

When it is remembered that La Peña was only two miles from Wheatley's fighting ground, and three from the Cerro, his conduct seems astounding as well as selfish. Graham's fight lasted two hours. La Peña could have ridden to see what was going forward in a quarter of an hour. He refused to stir, and deliberately sacrificed his allies because he had got a comfortable, almost an impregnable position on the Bermeja, and was not going to stir out of it, whatever happened. This was precisely the same conduct that he had displayed at Tudela in 1808, absolutely disloyal, selfish, and narrow. His troops were in very fair fighting trim—indeed the vanguard had done very well in the morning, and these same divisions of Lardizabal and Zayas behaved most creditably at Albuera two months later. With his 10,000 men he could have absolutely eaten up Villatte, and scattered the last remnants of Ruffin and Leval.

He had his reward. Next morning Graham, after collecting his wounded and his trophies, recrossed into the Isla, formally giving notice that in consequence of yesterday's proceedings he was forced to withdraw his consent given in February to serve under a Spanish officer. It is impossible to blame him; no one could deny, after what had happened on the 5th, that it was absolutely unsafe to go out in La Peña's company. Wellington sent his complete approval to Graham—well remembering his own fate at Cuesta's hands in 1809. But the campaign was done, and the victory was useless. Victor, who had retired far beyond Chiclana, and prepared to blow up his forts and batteries, could come back after a day's hesitation to re-occupy them, and to write a very paltry and disingenuous dispatch to the Emperor. Barrosa, in short, served as a land-mark in tactics, not as a turning point in the history of the Peninsular War.

THE CHAIRMAN: Has any gentleman any remarks to offer or questions to ask with regard to the lecture?

COLONEL W. H. P. PLOMER: I should like, on behalf of myself and the 87th Royal Irish Fusiliers, to thank you, Sir, for the very kind way you spoke of my regiment, and the members of the Institution for their kindness to-day. I have myself often heard the Battle of Barrosa described, but never such an account as I have heard to-day.

Captain R. J. Kentish also spoke.

THE CHAIRMAN: Ladies and gentlemen, I am sure you all wish to accord a vote of thanks to Professor Oman for his interesting lecture this evening. (Applause).

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BARROSA, MARCH 5th, 1811.

British Troops Present, and Losses.

		Present.			Losses.				
					Killed.		Wounded.		
		Officers	Men.	Total.	Officers	Men.	Officers	Men.	Total.
Infantry—									
Dilkes' Brigade	1st Guards, 2nd battn. (5 Coys.)	24	587	611	1	33	8	177	219
	Coldstream Gds., 2nd battn. (2 Coys.)	7	204	211	1	8	2	47	58
	3rd Guards, 2nd battn. (3 Coys.)	8	314	322	1	14	2	85	102
	2/95th Regt. (2 Coys.).	11	206	217	—	6	—	28	34
Wheatley's Brigade.	1/28th Regt. (8 Coys.)	20	437	457	—	6	—	80	86
	2/67th Regt.	23	504	527	—	10	4	31	45
	2/87th Regt.	32	664	696	1	44	4	124	173
	20th Portuguese (2 light companies)	16	316	332	—	9	5	42	56
Browne's Flank Battalion—(2 Coys. each of 1/9th, 1/28th, 2 82nd)		22	514	536	—	25	11	200	236
Barnard's Flank Battalion - (2 Coys 2/47th, 4 Coys. 3/95th)		29	615	644	2	33	5	97	137
Cavalry—2 squadrons 2nd Hussars, King's German Legion		13	193	206	—	—	2	32	34
Royal Artillery (including drivers and train)		20	342	362	—	6	8	40	54
Royal Engineers		9	50	59	—	1	—	2	3
Royal Staff Corps		2	35	37	—	—	—	1	1
	Total...	236	4981	5217	6	195	51	986	1238

N.B. Of these troops on the field Dilkes's brigade *minus* the 211 Coldstreamers, but *plus* 260 of the 2/67th and Browne's flank battalion, formed the right column, while Wheatley's brigade *minus* the wing of the 2/67th, but *plus* the two Coldstream companies and Barnard's flank battalion was on the left. All the guns were with the latter column. Thus Dilkes's command must have been about 1,950 strong, Wheatley's about 2,883. The cavalry were absent with Whittingham on the coast road, till nearly the end of the engagement.

French Troops Present, and Losses.

(1).—Troops which were engaged in the battle of Barrosa.

		Present.			Losses.						
					killed.		w'nded.		unw'ded pris'n'rs		
		Officers.	Men.	Total.	Officers.	Men.	Officers.	Men.	Officers	Men.	Total.
Infantry—											
Ruffin's Division	9th Léger (2nd battn.)	15	581	606	1	14	4	70	1	18	108
	24th Ligne (1st and 2nd battns.)	37	1156	1193	2	33	7	214	3	21	280
	96th Ligne (1st battn.)	26	738	764	2	39	6	193	2	1	249
	2 Provisional battalions of Grenadiers*	see note *			1	20	5	196	1	59	222
Leval's Division	8th Ligne (1st and 2nd battns.)	43	1425	1468	11	63	11	622	—	19	726
	45th Ligne (1st battn.)	27	683	710	1	7	—	44	—	3	55
	54th Ligne (1st and 2nd battns.)	42	1281	1323	3	26	10	284	—	—	323
	Grenadier companies of the 3rd battalions of the 8th, 45th, 54th, 24th, 96th Ligne, and 9th Léger†	19	530	549	—	—	—	—	see note †		
Cavalry—1st Dragoons		21	377	398	—	2	6	30	1	3	42
Artillery—2 batteries		8	161	169	1	16	3	31	1	—	52
Etat-Major		?	?	?	2	—	2	—	1	—	5
	Total...	238	6942	7180	24	220	54	1630	10	123	2062

* These two battalions were formed of the 14 grenadier companies of the 1st and 2nd battalions of all the seven regiments of Ruffin's and Leval's divisions, including those of the 16th Leger absent with Soult. The men are therefore all counted already in their battalions, save those of the last named regiment, who were probably about 7 officers and 170 men, a figure which should be added to the above total of 7,180. That these companies were present at Barrosa is shown by the fact that two casualties of officers of the 16th Leger are recorded in Martinien's lists.

† Losses of these six companies included above in those of the "Grenadiers Réunis" of Ruffin's division in the French returns. These companies were little engaged, and can have lost only 20 or 30 men.

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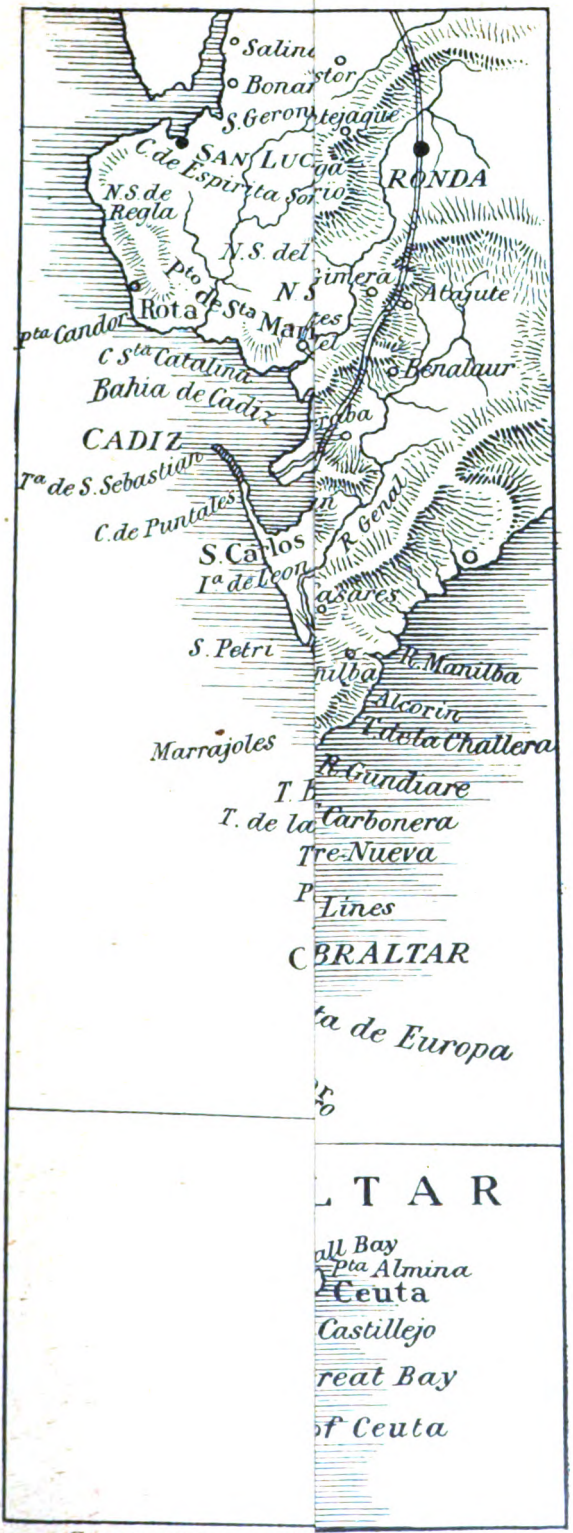
Map to illus5th, 1811.



CORRIGENDA:—Pla
1. For "47th Ligne"
2. The 3 troops on the

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(2).—Troops engaged against the Spaniards, in the Combat of Santi Petri.‡

Infantry—												
Villatte's Division.	27th Léger (1st and 3rd battns.)	43	982	1025	1	20	7	150	2	21	201
	94th Ligne (1st battn.)	15	535	550	1	9	3	49	—	–	62
	95th Ligne (2nd and 3rd battns.)	30	1026	1056	—	1	—	82	–	1	34
Cavalry—2nd Drag ons		19	270	289	—	3	—	12	—	4	19
Artillery—1 battery		3	75	78	—	—	—	—	—	—	—
Etat-Major		?	?	?	—	—	1	—	—	—	1
	Total...	110	2881	2998	2	33	11	243	2	26	317

‡ The troops from these divisions absent with General Cassagne at Medina Sidonia, were the 2/96th, 2/45th, 3/94th, 1/95th, a battalion of Voltigeur companies from the 3rd battalions of the 8th, 24th, 96th, 45th, 54th, 9th Léger, and the 5th Chasseurs à cheval. The 1st battalion 9th Léger, 2/45th, and 1/94th were left in the siege lines.

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The "Scientific Corps" in Spain.

By MAJOR GENERAL J. C. DALTON, R.A. (retired).

THE Corps of Artillery and Engineers in Spain are not educated together at one great Military School as with us, but separately. The Artillery College is at Segovia in the splendid old "Alcazar" or Moorish fortress, and the course for the artillery cadets (or Alumnos) has been described more than once in this Journal. It will suffice for the moment to say that it is a specially severe and comprehensive one, lasting about five years and including practical as well as theoretical work. The course in mathematics in particular is a high one, and few officers get commissioned in the artillery who are not well up in that science.

The Engineers are similarly brought up at Guadalaxara, which is the Chatham of Spain.

For many years these two Corps have been suffering from a serious lack of proportionate representation in the "Generalato," or fixed establishment of General Officers, and in comparison with other arms of the service these Corps have found themselves placed in a position of great disadvantage as regards the higher and more important army commands.

It is not so very long since that a similar state of affairs existed in this country. Though the Royal Artillery and Royal Engineers were granted a fixed establishment of General Officers, these officers, with the rarest exceptions, were not entrusted with army commands, nor were the junior ranks even of the Regiment given army staff appointments, and it seemed to be thought that the superior education and attainments of Royal Artillery and Royal Engineer officers were to be devoted exclusively to the scientific needs of their own services. There were certain appointments reserved for them, and if their ambition aspired to general army duties, they were met by the reply that they were well provided for in their own line, and must be satisfied.

Fortunately, however, those days have come to an end, and it is only necessary to look through the Army List to find that there is now a considerable leaven of the Scientific Corps in the lists of those holding army commands, and on the General Staff. Moreover, though it is perhaps not for us to say so, the confidence bestowed when the officers of the Scientific Corps were assigned a fair proportion of army commands and general staff work does not seem to have been misplaced. From the monthly Army List, March, 1910,

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we see that, excluding Royal Personages, the Indian Army and Marines,

out of 6 Field Marshals there are 1 R.A. and 1 R.E.
" " 10 Generals " " 1 R.A. and 1 R.E.
" " 21 Lieut. Generals " " 4 R.A. and 3 R.E.
" " 78 Major Generals " " 18 R.A. and 8 R.E.

Of the Generals, all but very few have held, or are holding, General Army appointments.

Things move slowly in Spain, and if it took us many years to assert just claims and ambitions and get them recognised, it has taken a considerably longer time in the case of our Spanish comrades of the same branches.

The Spanish artillery are, as we were till recently, all on one list for promotion. As is well known to anyone who has had the privilege of being in a position to judge, the officers of artillery (and Engineers) in Spain have the advantage of a very high standard of education and are devoted to their profession. They are eligible to compete for admission to the Staff Corps by passing the examination for admission to the Staff College, which is open to all arms of the service.* Speaking as comrades of the Spanish Scientific Corps it is satisfactory to learn, from an article which we have seen in the "Memorial de Artilleria" for May, 1910, that the policy which has hitherto checked the reasonable ambitions of the Spanish Artillery and Engineer officers is at last to be changed, and the credit of this tardy act of justice and wisdom is due to the Minister of War, General Aznar, who has plainly stated that all branches of the service shall be proportionately represented in the fixed establishment of General Officers. The question has agitated military opinion for a long time. Efforts were made to suppress some of the privileges and unequal favours granted to certain Corps in respect to commands, but hitherto little headway has been made, and it might be affirmed that in Spain the Artillery and Engineers were practically unrepresented in the Spanish " Generalato." The *principle* has existed apparently for some time, that all arms and Corps are eligible to be so represented, but *in practice*, owing probably to the want of Generals of Artillery and Engineers to watch the interests of their own people, these Corps have suffered.

The article on this subject, in the "Memorial de Artilleria" above alluded to, naturally speaks feelingly, and alludes to the custom prevailing in other countries in this respect. It states that in France some ten per cent. of the General Staff are artillery officers holding appointments special to that service, without prejudice to a larger number of artillery generals, who share with those of other arms, commands of a general character; whereas in Spain the "Generalato" does not even contain enough artillery generals to fill the few appointments special to that arm.

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* 55 per cent are allowed for Infantry officers
20 " " " " Cavalry " } Captains and Lieutenants
15 " " " " Artillery " } are eligible for admission.
10 " " " " Engineer "

The course lasts three years and is a very thorough one. After graduating, the officer goes to a different arm of the service for two years and to a course at the "Escuela Central de Tiro" and then joins his unit until admitted to the Staff Corps where he remains.

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The following figures give an idea of the state of affairs and speak for themselves:—

"Of 31 Lieut. Generals, 20 came from the infantry, 2 from the cavalry, 8 from the Staff, 1 from the engineers and *none* from the artillery. Of 60 Generals of Divisions, 35 are infantry, 14 cavalry, 8 Staff, 2 artillery and 1 engineers."

The article in the "Memorial de Artilleria" comments bitterly on the way the artillery and engineers are handicapped in this particular. The want of experienced officers of these arms in the higher ranks of the army, affects both Corps and cramps their proper development and efficiency.

In welcoming the prospect of an amelioration of the disadvantageous position in which the Spanish artillery and engineers have been hitherto placed, the article in the "Memorial," which we have only briefly referred to, ventures a hope that the addition of generals of these arms to the fixed establishment will not only be of great benefit to the Corps themselves, but will infuse new sap into the vigorous tree of the Spanish "Generalato" on whose capacity and enthusiasm the whole nation and army rely.

We feel sure that such an act of justice will not be misplaced and will result in benefit to the country.

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THE MAXIM AEROPLANE.

By COLONEL F. G. STONE, *psc.*, R.A.
(Member of the Aeronautical Society of Great Britian).

SIXTEEN years ago, Sir Hiram Maxim built his first flying machine driven by a steam engine; as this article goes to press he has completed his second flying machine driven by an internal combustion engine. There is remarkably little difference between the design of the two machines in the main principles of construction; and a study of the Maxim patents taken out for the first machine, reveals in a remarkable manner, how thoroughly the inventor had grasped the essential features of a successful flying machine which only required the advent of the petrol engine to make it a practical means of conveyance in the air.

A careful investigation of the causes of the unreliability of most of the aeroplanes which had made any flights worth mentioning, convinced Sir Hiram Maxim that the first and most essential requisite for every machine, no matter what its design, was an improved carburetter; he therefore decided to take up the carburetter first, and having made drawings of a new motor, experimented with the carburetter while the motor was being built; I will, therefore, describe the carburetter first.

The outside casing of the carburetter consists of a rather long and thin vertical brass tube about three inches in diameter. Inside of this is another tube also of thin brass and about 2¼ inches in diameter. This inner tube is perforated and carries two pistons on a single rod. The lower end of this rod is in the form of a very small valve. When the air is sucked through this carburetter, the lowermost piston is lifted upward until it uncovers some of the perforations in the inner tube, and at the same time opens a small valve in the bottom, allowing petrol to enter, while the topmost piston acts as a dash pot. The whole apparatus is arranged and adjusted in such a manner, that the passage of air, in opening for itself a road, at the same time opens the little conical valve in a corresponding degree, so that the volume of air, and the volume of petrol always bear a fixed relation to each other, which has been adjusted with a certain degree of fineness, so that the exact mixture that does the most work with the least petrol is produced.

The petrol tank is situated beneath the motor and is under a pressure of 4lbs. to the square inch, but it makes no difference what the pressure is, whether it is 4lbs. or 40lbs., the pressure at the carburetter is always the same. This is due to a very carefully made and delicate pressure regulator, which can be adjusted to give any pressure desired, and when once adjusted the pressure is always the same.

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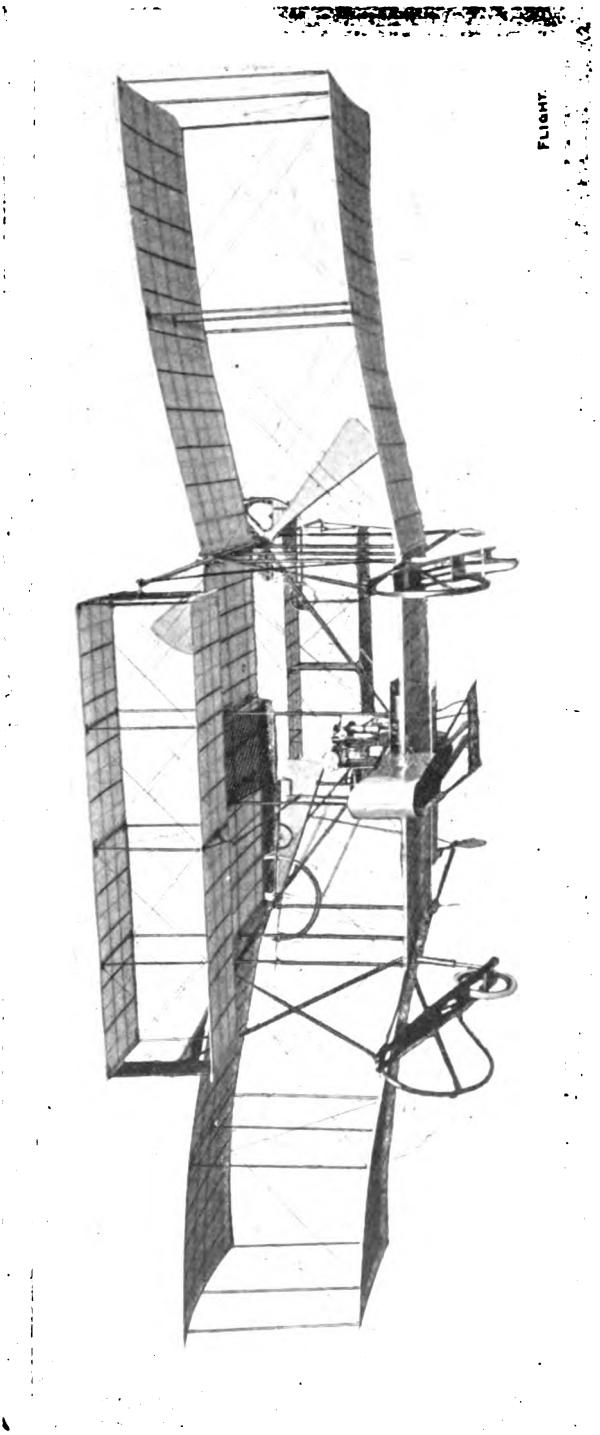
PLATE 1.



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Front view of the Maxim Biplane.

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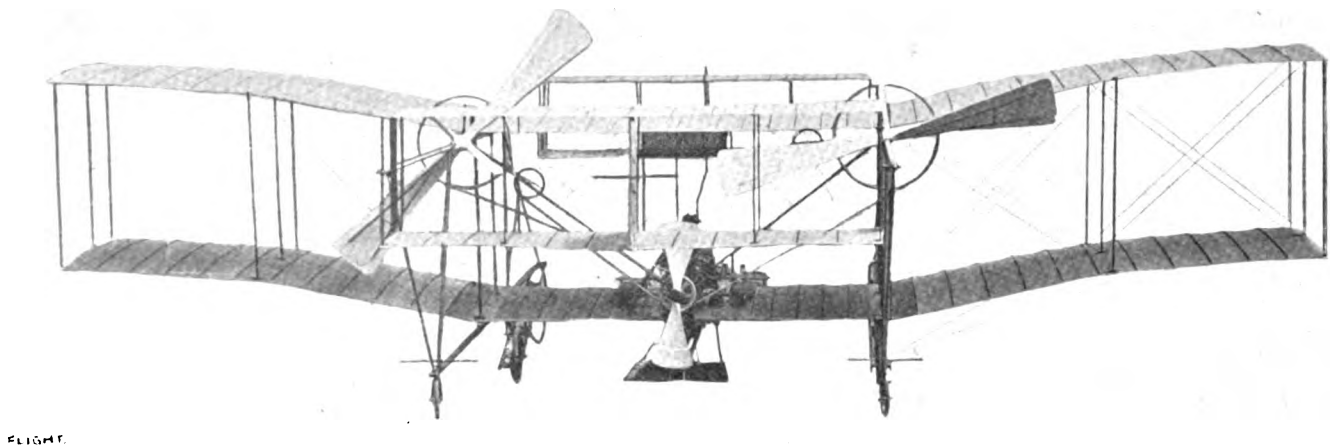

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Rear view of the Maxim biplane, showing the disposition of the three propellers. The small propeller runs in the wake of the principal masses.

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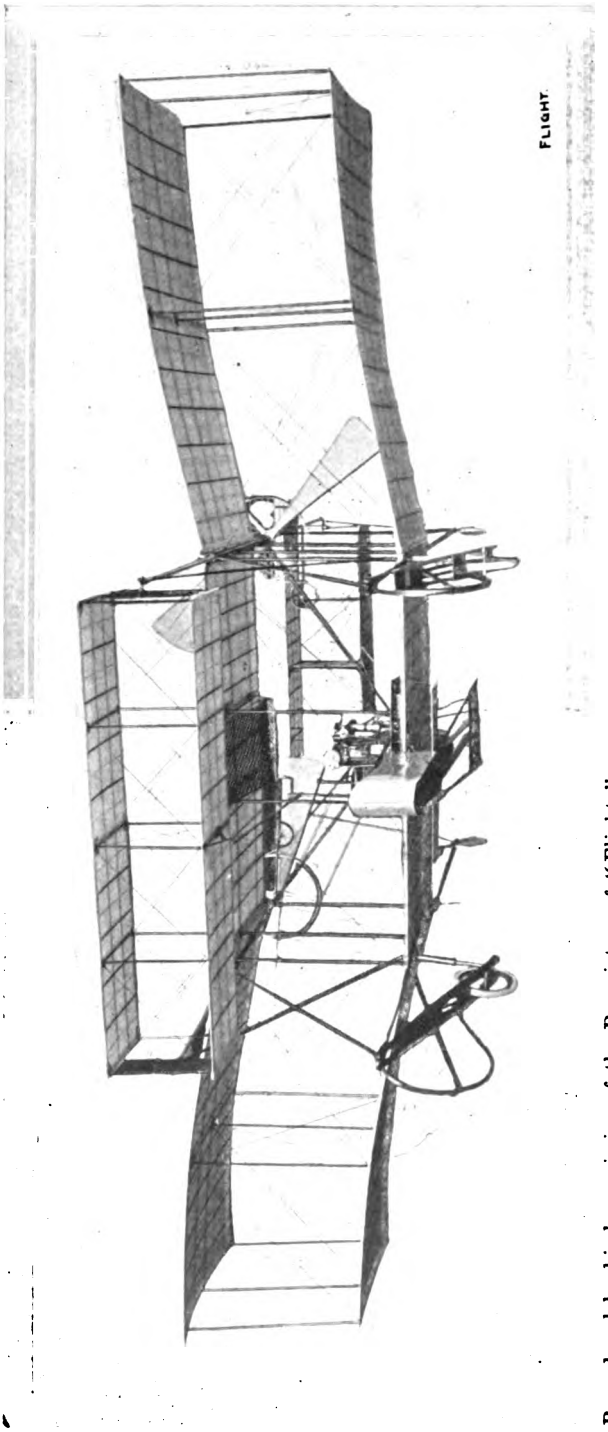
PLATE 1.



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Front view of the Maxim Biplane.

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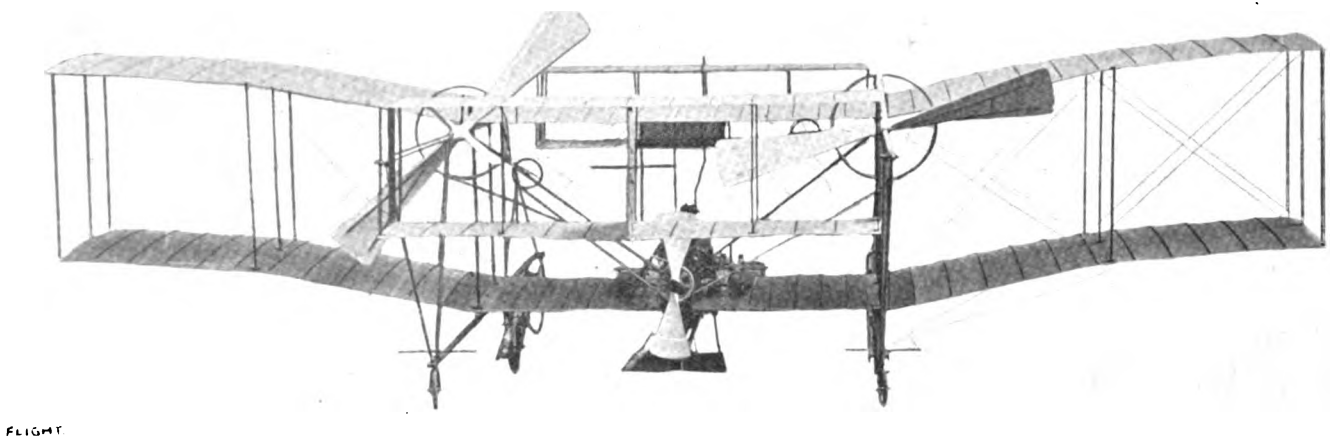
PLATE 2.



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Rear view of the Maxim biplane, showing the disposition of the three propellers. The small propeller runs in the wake of the principal masses.

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It was found that when this carburetter was used without being heated, the exhaust was nearly as irregular as with the French engines, but upon applying heat just sufficient to neutralise the refrigeration due to evaporation, so that the mixed gasses entered the cylinder at atmospheric temperature, it was found that the engine ran very steadily, practically as steady as a steam engine. It was found necessary to pass the spray of air and pertol through hundreds of very small tubes heated by the water from the jackets.

The motor:—

The motor is of extremely light construction; the cylinders, the crank shaft and connecting rods are of steel of remarkable strength and elasticity, the tensile strength being 57 tons with an elongation of 14 per cent. in six inches. The diameter of the pistons is 5 inches and they all have a common stroke of $5\frac{5}{8}$ inches. There are four cylinders, the upper end being $\frac{3}{32}$ inch thick, and the lower end $\frac{1}{16}$ inch. The crank shaft is hollow, very thin and very elastic. The water jackets are of German silver $\frac{1}{32}$ inch thick. All of the valves are on the top end of the cylinder and are all worked with one common cam shaft. The valves are very large and open wide. The passage ways for the carburetted air to enter the cylinders are all very large, and so is the exhaust. There is a complete water circulation everywhere. The stems of the exhaust valves are enclosed in a water jacket. The engine complete with the circulating pump, magneto, its attachments, and the oil circulating device weigh 220lbs., and when the engine is running at a speed of 1400 turns a minute it develops 87 H.P., but as all the parts are of extreme lightness, the pistons being of steel, it is possible to run the engine at a very high speed without any danger, so doubtless it may be run up to over 100 H.P. without any damage being done. The oil circulation is peculiar. A reciprocating pump has its piston drawn up by the action of a cam driven by a train of light gears, and four times a minute the cam releases the piston of the pump, when it is forced downward very quickly with a strong spiral spring, producing a pressure of 120lbs. per square inch on the oil. This squirts the oil into all the bearings and lubricates the cylinders and the gudgeon pins. The oil is filtered each time that it passes through the pump.

The aeroplane:—

The machine is a large biplane of unusual design, consisting of a central section, and two wing sections inclined to each other so as to form an interrupted dihedral angle, and thus secure a certain amount of lateral stability; the pilot's seat, immediately in front of the engine, is situated on the lower deck of the central section, thus bringing the centre of gravity down very low.

The flight path is regulated by a biplane elevator in front, connected with a biplane tail in rear, thus securing a fore and aft control as in the case of the Cody; this principle has also been adopted in a modified form in the latest type of Farman machine, in which the elevator in front is interconnected with a hinged flap on the tail; the advantage gained by this fore and aft control of the flight path, is that when the front elevator is raised in order to impart

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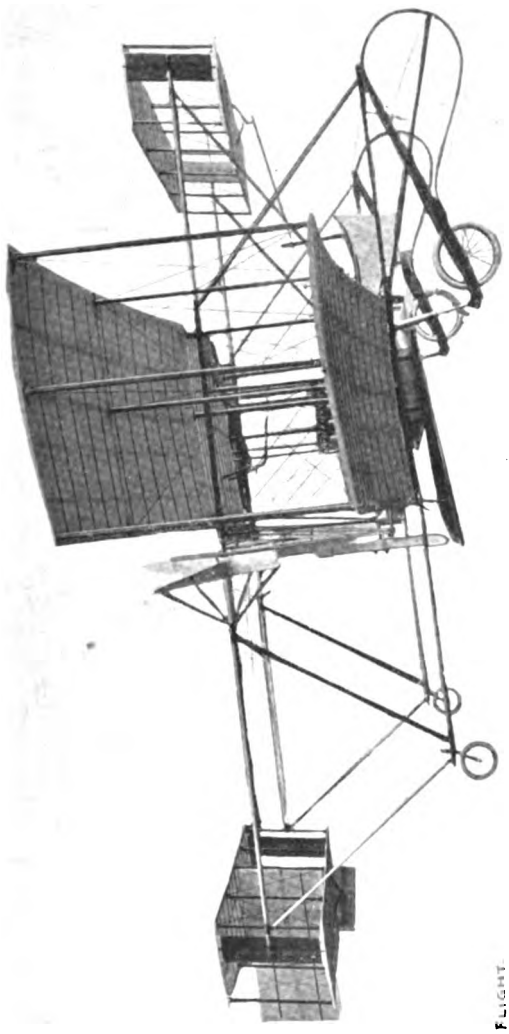
PLATE 3.



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Side view of the Maxim biplane, showing very clearly the arrangement of the two principal fore and aft spars that carry the elevator, tail and propellers.

an upward direction to the flight path, it is relieved of the task of overcoming the inertia of the tail, which is given a simultaneous downward dip corresponding to the tilt of the elevator; this, in view of the distance of the tail planes from the centre of gravity, is a factor of considerable importance. The elevator and the tail are both pivoted to the extremities of two tubular spars which run fore and aft the whole length of the machine, and not only constitute the main members of the framework, but also carry the two main propellers and thus save the weight of special brackets for this purpose. These two spars are a very essential and important feature in the

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design, they are built up in three sections, the central one being of steel, and the two outer ones of aluminium, stayed by means of diagonal struts to the lower deck of the main planes.

There are three propellers, the two outer ones being 11 feet 4 inches in diameter, and mounted as stated above on the main spars of the frame; they revolve in opposite directions, the right hand one (seen from the rear) revolving in the same direction as the central propeller, and the left hand one revolving in the opposite direction at a more rapid rate, to compensate the gyroscopic effect on the aeroplane of the other two propellers. The two outer or main propellers are two bladed, and remarkably thin and light; in order to strengthen them, they are trussed by means of steel strip ties which connect their extremities to a tubular extension of the boss in prolongation of the shaft; these strips are given the same pitch as the propeller blades, and thus cause little loss of power, if any, by the resistance of the air to their rotation. These propellers are driven from the engine shaft by means of hempen ropes kept taut by means of jockey pulleys; the ropes are woven at the Crayford factory in the form of endless bands of circular section, by special machinery designed for the purpose; it is scarcely conceivable that any flaw can exist in a rope made in this manner and from the material employed. An advantage incidental to the rope drive as opposed to the chain drive, apart from its greater reliability, is the absence of noise; those who are accustomed to the use of Wright or other chain driven propellers complain with justice that the noise is almost stupifying during a long flight.

The small central propeller of 5 feet diameter, is driven direct; its object is to recover some of the energy from the wake of the mass and also to act as a fly wheel; in the Maxim aeroplane the principle of placing all the principal resisting surfaces in one central line has been carefully observed, and the following rush of air must amount to a very considerable asset, of which full advantage is taken by the introduction of the central propeller working in a medium which offers greater resistance than that in which the two larger propellers are working.

The Control:—

It has already been explained that the flight path is controlled simultaneously fore and aft by means of interconnected elevator in front and tail planes in rear actuated inversely in relation to each other; there is a single vertical rudder for direction between the tail planes which is actuated by turning the steering wheel in the desired direction; the rocking of the wheel fore and aft actuates the elevator and tail planes. The wings are warped by means of a foot pedal acting on them through wire connection ties which pull against springs in such a manner that pressure on the pedal will warp in one direction, while relaxation of pressure on the pedal will allow the springs to warp in the other direction.

Sir Hiram explained to me that no system of automatic control by means of a gyroscope was feasible; inasmuch as no aeroplane structure could stand the stresses which would be set up by a gyroscope having the power (and weight) to maintain it on an even keel;

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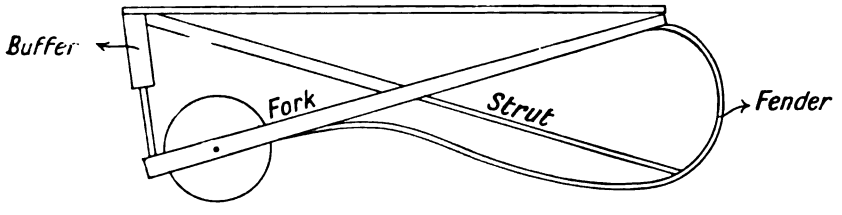
but he is fully alive to the advantages of what may be termed assisted gyroscopic control, and has patented and constructed a complete system of gyroscopic regulation to prevent pitching by the control of the fore and aft planes, which constitute the front elevator and tail respectively. The gyroscope does not work directly on the planes themselves, but simply controls the position of a small and perfectly balanced air valve, and compressed air is the agency which actually operates the movements of the fore and aft planes, the gyroscope merely determining on which side of the piston the air shall be admitted; the movement of the planes in the required direction automatically shuts off the air pressure on the same principle as is employed in the steam steering gear of a ship. The gyroscopic control will not be fitted as a permanent feature until after the preliminary trials have shown that the aeroplane is in all respects free from any faults in design or construction.

Framework and chassis:—

The material employed in the framework is principally American yellow pine, supplemented by tubular steel and aluminium, and hard wood in places; it is mounted on four pneumatic wheels; the two front ones, which have a very wide track, are independently attached to the frame and mounted on short axles held by massive wooden forkes hinged to the frame and attached to pneumatic buffers. Springing from the front end of the fork is a fender of ash shaped like a bow, which stands well out in front of and below the lower



deck of the central section, and protects the machine from damage in alighting; the two rear wheels support the tail and are interconnected with the vertical rudder mechanism, so as to enable the machine to be steered when running on the ground.

Dimensions:—

The principal dimensions, &c., are as follows:—

Total area of main planes	572 sq. ft.
Elevator planes	81 „ „
Tail planes	81 „ „
Total breadth of main planes	44 feet.
Depth of main planes	6 ft. 6 in.
Breadth of elevator and tail planes	13 ft. 6 in.
Depth of elevator and tail planes.	3 feet.
Length of rudder	5 ft. 6 in.
Height of rudder	3 feet.
Total length from front to rear	35 ft. 6 in.

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Testing:—

A circular asphalte track has been made at the Crayford works 730 yards in circumference, with a steel mast in the centre from which a wire rope fixed to a ring which revolves freely round the mast, is led to the track where it is attached to the aeroplane. By this means all the preliminary trials, short of free flight, can be made, and the pilot can obtain a very fair degree of proficiency in the manipulation of the control arrangements. It seems not unlikely that the use of this testing ground may become extremely popular among pilots of other machines than the Maxim, who desire to familiarise themselves thoroughly with the control of their machines before attempting free flight. There is plenty of good covered accommodation for aeroplanes at Crayford, and board and lodging can be obtained on the spot.

Conclusion:—

In conclusion I must express my cordial thanks to the proprietors of *Flight* for permission to reprint their copyright plates, and for lending the blocks for the purpose; they are superior to any which I could obtain from other sources. I recommend any readers of the Journal who desire to study the details of construction from a constructor's point of view, to read the excellent technical articles in *Flight* of 30th April and 7th May, which contain innumerable illustrations and enable the student to obtain information on points which cannot conveniently be dealt with in a general descriptive article such as the present one.

I may add that any officer of the Royal Artillery who is desirous of studying this interesting machine at first hand, would receive a cordial welcome from Sir Hiram Maxim at the Crayford Aeroplane Works, if he wrote beforehand to make an appointment.

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Some Ideas on the Fire Tactics of a Coast Defence Fire Command.

By MAJOR C. R. BUCKLE, D.S.O., R.A.

BEFORE forming an opinion as to the most suitable fire tactics to employ when fighting a fire command, it is desirable to first have as clear a conception as possible of the tactics which we imagine the attacking fleet will adopt.

The object which a naval power has in view when attacking coast defences is to increase her superiority at sea. To attain this object, when she attacks a coast fortress, she will endeavour to destroy or seriously damage the warships which are re-fitting in the dockyard which the fortress is designed to protect, or the docks and workshops themselves, whilst suffering the least possible loss or damage to her own ships. Before undertaking any such operation, an Admiral will carefully consider how, after having brought the operation to a successful issue, he will stand with reference to his enemy at sea.

If he is likely to lose or render ineffective several of his own ships in making such an attack, it may not be worth the risk to attack at all, since although successful in rendering inefficient the warships covered by the coast fortress, he may yet leave his own fleet so damaged that the balance of sea power has in no way been improved in his favour by the undertaking.

The small number of heavy guns, the short "life" of these guns, and the limited amount of ammunition which a warship could carry, have up to recent years been factors which seriously militate against warships attacking a coast fortress. These have, however, now disappeared to some extent. The battleship of to-day mounts a broadside of three times as many heavy guns as the battleship of six years ago and carries a larger supply of ammunition. Improvements in propellants have prolonged the life of heavy guns, in some cases fourfold. Watertight compartments and modern armour provide such protection to a ship's vitals that the risk she runs of being completely disabled by the gun fire of a British coast fortress is almost negligible. Every advance has been in favour of the fleet, whilst the coast fortress is in much the same state as it was six years ago. The bombardment of a dockyard, although still a somewhat risky undertaking, has now certainly become a more feasible project.

The warships in harbour, the docks and the workshops being the chief objective of an attacking fleet, we may conclude that when making an attack, the fleet will be placed in the most favourable

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position for firing on these objects, and that the batteries which defend the harbour will only be fired on when by so doing the attacking fleet hopes to facilitate the destruction of the contents of the harbour. A battleship experiences difficulty in engaging several objectives at the same time, therefore the more our batteries are distributed as single gun batteries the less likely will they be to come under the fire of the attacking ships, or if they are fired on, the greater the protection they will afford to the harbour by attracting the fire of several ships from the harbour to themselves.

The attack on the dockyard may be carried out by direct fire or by indirect fire. If direct fire is employed, either the ships which are bombarding must come within a range at which they can observe their fire, or else they must correct their fire with the aid of a "spotting" ship at a much closer range or a "spotting" party on some commanding position on shore which overlooks the harbour. If indirect fire is used a "spotting" ship or party becomes a necessity.

The attacking ships must maintain some definite formation whilst carrying out the bombardment, which will probably be such as will enable them to bring their broadsides to bear on their objective. They must have water and space in which to manœuvre, a condition which may limit the number of ships which can usefully be employed. They must of necessity keep under way, for if they anchor, it will be, except under very favourable conditions of wind, impossible for them to clear the smoke which will be caused by their own guns and the bursting shell of the guns of the fortress.

The closer the attacking ships come to the guns of the fortress, the more liable will they be to be vitally injured.

If the attacking ships come within range of the medium guns of a fortress, a considerably greater volume of fire will be brought to bear on them which may cause them some damage and will most certainly greatly interfere with their arrangements for bombarding the harbour by smothering them in smoke.

The feasibility of a "spotting" ship coming near enough to the harbour to "spot" for a fleet bombarding from a distance is extremely doubtful. She would receive such a volume of fire that probably she would be unable to observe, or if she did observe be unable to communicate the results of her observation to the remainder of the fleet.

The form of attack which appears to offer the best prospect of success is a bombardment at a range beyond that at which the guns of the medium armament of a fortress can fire, observation being carried out from a post on shore. The establishment of such a post for a few hours is by no means an impossible undertaking. The necessary appliances for establishing communication may be brought to the vicinity of the post before war is declared, the men to work these appliances might be moved there undetected; to ensure success, all that is required is the absence of an armed party from the immediate neighbourhood of the post for a few hours.

Having thus briefly reviewed the considerations which may influence a naval power when attacking a fortress, we are in a better position to consider the fire tactics which the artillery of the fortress should adopt to deal with the attack.

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The coast defence artilleryman must never lose sight of the fact that his rôle is the defence of the harbour and the protection of its contents from damage. The concentration of a very heavy fire on one attacking ship with a view to sinking her whilst other ships are left undisturbed to carry on the bombardment of the dockyard, would be the worst possible tactics. The sinking of an armoured ship at long range by the guns at present mounted in a British fortress, if not an impossibility, is an extremely improbable occurrence. These guns can, however, if a sufficient number can be brought to bear on the attacking ships, so smother them with smoke from bursting shell that the gun crews will be unable to see to lay their guns with any success, and at the same time a certain percentage of hits may be causing such injuries to the ships as will affect their fighting efficiency.

The first essential, then, is to keep every ship which is bombarding the dockyard, under such a heavy fire that she cannot see to fight her guns. If we can be sure that any particular ship is firing on the batteries and not on the dockyard we may leave her alone for the time being, as she is doing no direct harm to the ships and buildings which it is our business to protect.

The rate of fire should be such as will ensure the attacking ships being covered with smoke. This will depend on the number of guns we can bring to bear on each attacking ship, and largely on the force and direction of the wind. With a wind following the attacking ships and slightly in the direction of the objective they are engaging, it will not be necessary to maintain such a rapid rate of fire as when the wind is in the opposite direction. The old idea of firing deliberately at long ranges and rapidly when a ship comes in to close range must go the way of many other such ideas. The maximum rate of fire may be just as necessary at extreme as at short ranges; the rate must be that best suited to prevent the attacking ship doing damage to the contents of the harbour. At one moment every gun may have to fire as fast as possible, at another a much slower rate may suffice and an opportunity may occur of replenishing the ammunition on the gun floor. It is a matter for each battery commander to decide at the moment. Economy in ammunition is unnecessary, for we are not engaged in lengthy siege operations, we are only called upon to protect our charge for a few days, or at the outside a few weeks, until such time as the British fleet has brought to a successful issue the operations which it is engaged in elsewhere.

The case of advanced batteries whose guns do not bear on waters from which a bombardment of the dockyard can be carried out and past which attacking ships have to run, is somewhat different. The attacking ships are not yet in a position to inflict damage on the dockyard; our tactics in this case should aim at, if possible, preventing one or more ships from reaching such a position and, therefore, concentration of fire on a single ship would be quite legitimate. A rapid rate of fire should be opened at extreme range with a view to making the attacker abandon his idea of running past, but the rate of fire must not be such as will reduce the amount of ammunition available on the gun floor below a certain limit. It is essential that sufficient ammunition should be at hand to maintain the maximum rate of fire when the ships selected for attack are at

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the shortest range, for then is the time when the batteries have the best chance of crippling them.

As regards the point at which we should endeavour to hit a ship. The present idea is to endeavour to hit her below the conning tower or one of the turrets on the chance of doing damage to an important part of the ship. This at close range is very possibly the best point of attack, but at a range of 13,000 yards it will be very difficult to know exactly where we are hitting. At long ranges the attempt to hit some one definite point must be abandoned, and we must content ourselves with trying to hit her forward, aft or amidships. The portion of the ship against which we direct our fire should be governed by the ship's speed and by the direction of the wind; our object being, whilst hoping that some small percentage of our shell may do the ship some serious damage, to cause the maximum amount of interference with the ship's gun fire, with every round which we fire. This can best be achieved by so planting each shell that the smoke of its burst will come between the ship's gun crews and the object they are firing at. In this connection it should be borne in mind that a heavy shell bursting just "short," say within 30 yards of a ship, will cause a considerable amount of interference with her gun fire, whereas the shell which is just "over" caused no interference at all. The present system of marking at service company practice under which, if the projectile arrives at an angle which does not admit of ricochet, there is no permissible error allowed for a round short of the target is not conducive to getting "short" rounds. Shell bursting slightly "short" will be of considerable value and might be encouraged at service company practice by giving half a hit for a round which falls within 30 yards short of the target.

When a battery first opens fire it is most desirable that the battery commander should be able to clearly distinguish his first two or three rounds from those fired from any other battery which has been allotted to the same target. This can be arranged by the fire commander directing one battery to range forward and another aft, if the ship presents sufficient length to the batteries. Should the ship be of such a length and be steering such a course as to subtend an angle of not less than 40 minutes from the batteries engaging her, it will be quite feasible for two batteries to range simultaneously. If the vessel subtends a lesser angle than 40 minutes, a better plan is for each battery to range separately.

A method of carrying out this system without making the fire commander's fighting message unduly long, is to have an understanding that batteries always range according to the order in which they are named in the fire commander's message. Thus supposing the fire command consists of 8 batteries:—

A.	Battery	mounting	1 gun
B.	„	„	2 guns
C.	„	„	2 guns
D.	„	„	1 gun.
E.	„	„	1 gun.
F.	„	„	2 guns
G.	„	„	1 gun
H.	„	„	1 gun

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and that the portion of the attacking fleet which the fire command has to engage consists of three battleships, all of which are firing on the dockyard. The fire commander might wish to detail A., B. and D. batteries, to engage vessel 1, the leading ship. C., E. and G. batteries, to engage vessel 2, the second ship in the line; and F. and H. batteries vessel 3, the third ship in the line. The fire commander's message would be framed thus: "A., B. and D., vessel 1; C., E. and G., vessel 2; F. and H., vessel 3." The first named battery in each case, viz., batteries A., C. and F., would range forward, the next named batteries, viz., B., E. and H., would range aft. Batteries B. and E., would transfer their fire forward as soon as ranged, when batteries D. and G. would range aft.

If a ship did not present a larger front to the batteries than 40 minutes, each would range in turn. A., C. and F. batteries would each fire 3 rounds at the ship which they were allotted to and then cease firing, whilst B., E. and H. batteries each fired 3 rounds. B. and E. batteries would then cease firing whilst D. and G. batteries fired 3 rounds. Each battery commander by counting the rounds fired at the target to which his battery is allotted knows exactly when he may open fire. Directly all the batteries allotted to a ship have fired their 3 ranging rounds, all batteries open fire, directing their shell on such portions of the ship as will cause the maximum amount of interference with her gun fire. In this case the letters "R.S.," meaning "batteries range in succession," would be added at the end of the fire commander's message.

If some such system as this be adopted and thoroughly understood throughout the fire command, a simple message sent simultaneously by means of the switch-board to all battery commanders worded thus: "A.B.D. vessel 1; C.E.G. vessel 2; F.H. vessel 3; R.S.," informs every battery commander not only what he has got to do himself, but what every other battery in the command is doing and enables each to distinguish the fall of his own shell whilst ranging.

As the action progresses, if a battery commander considers it necessary to verify his correction, all he has to do is to alter his deflection for a couple of rounds so as to bring his shell just in front of the bows of the ship.

At the present time the occasions on which we can put any scheme of fire tactics to a really practical test are confined to one, or at most two, days battle practice in the year. The provision, however, of a sub-calibre gun for each heavy gun in a fortress should improve matters greatly and enable us, by frequent practice, to do our utmost to solve the difficult problem with which we are confronted, viz., that of nullifying the fire effect of six to ten guns on an attacking ship with one gun on shore.

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AN OBSERVATION LADDER.

By LIEUT.-COLONEL L. A. C. GORDON, R.F.A.

THE ladder, an illustration of which is given, was constructed last year in the workshops of the 78th Battery, R.F.A., by Armament Artificer Serjeant Turner under the superintendence of Lieut. F. H. Hornsby, R.F.A.

The expense incurred was very small, as the wheels and body were those of a line cart, and the remaining parts were not of expensive material.

In ordinary circumstances a pair of horses is sufficient, but in heavy sand, such as is found at the practice camps in the Punjab, two pairs are better if the ladder is to accompany the battery commander on his reconnaissance. The men to work the ladder are the look-out men, and thus if only one pair of horses is needed there are no extra horses required.

With well drilled numbers it required 30 to 40 seconds to put up; and the observer's eye was 22½ feet from the ground.

In a flat country like the Punjab, it is impossible to exaggerate the enormous advantage such a command confers on the observer. It increases the power of observation fourfold. It was, moreover, difficult to detect, if placed near a tree, at quite short ranges. There are many advantages in such a ladder which it is unnecessary to enumerate, and possibly only one disadvantage, namely, the provision of an extra pair of horses in heavy ground.

This ladder has a very steady platform, and is quite strong enough to bear an extra man on its rungs; but to obviate orderlies running up and down, a leather bag was worked by whipcord running through a pulley attached to the under surface of the table.

Should any further information be desired regarding this ladder, it could, no doubt, be obtained from the O.C., 78th Battery, R.F.A.

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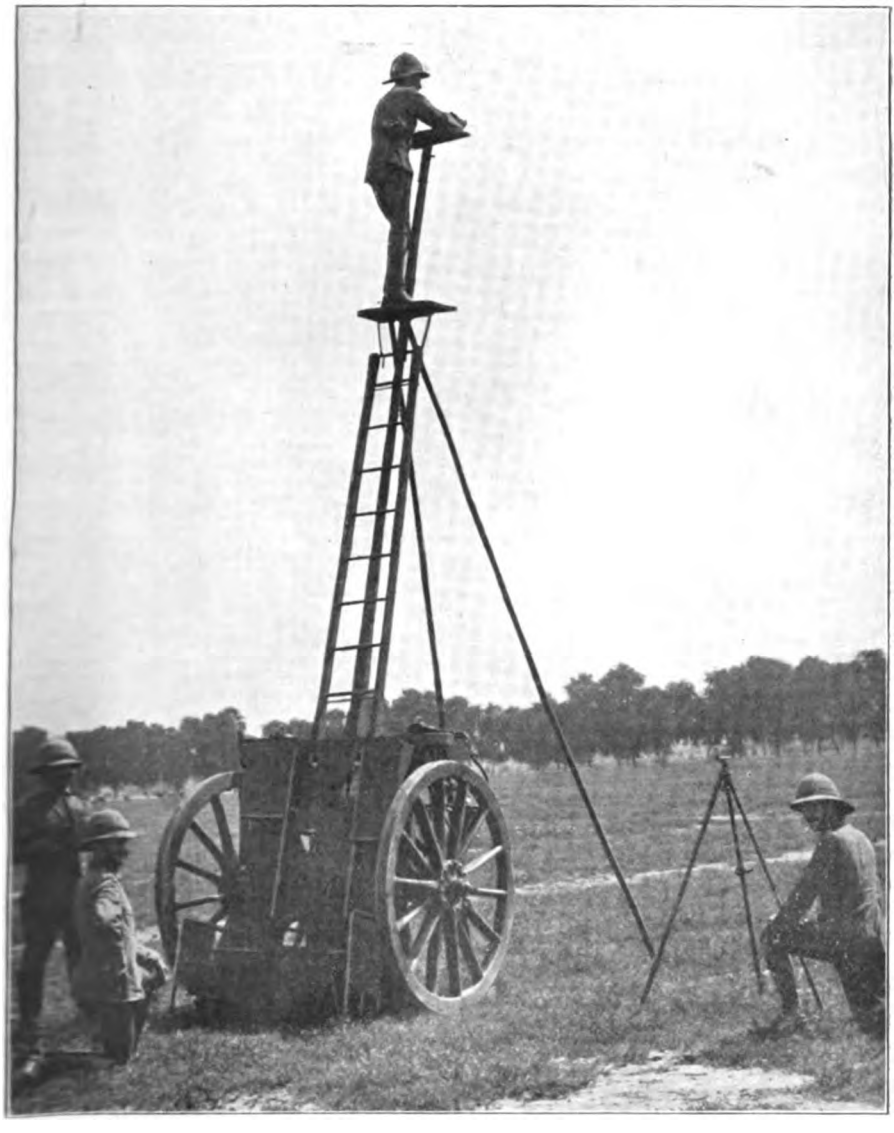

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Krupp's 1910 pattern Sights for Field Guns.

By Bt.-COLONEL H. A. BETHELL, R.F.A.

WHEN the independent line of sight was introduced by the French in 1897, it was considered practically impossible to use a reciprocating sight with this gear, the leading feature of which is that the gun can be elevated and depressed without moving the sight, which still remains directed on the target. But in view of the necessity for "pin-point" shooting at shielded guns, it is now considered desirable to eliminate the source of inaccuracy arising from difference of level of wheels. This entails the use of a reciprocating sight, which, in order to act correctly, must be pivoted on an axis which is always parallel to that of the gun. At first sight the two requirements appear irreconcilable. But Messrs. Krupp, several years ago, brought out a sight pivoted on the cradle, and connected to the elevating wheel by gearing such that as the breech of the gun was lowered by the elevating gear the sight was raised through an equal arc, and still pointed at the target.[1] This gear was somewhat complicated, and was adopted by only two (Sweden and Italy) out of the ten States to whom Krupp has supplied equipments.

The new simplified gear is shown in the annexed illustrations. The laying wheel, U (fig. 2) turns the lower elevating screw, by which the sights are brought to bear upon the target; the elevating wheel W turns the upper elevating screw, and gives the gun the elevation for the range. The elevating wheel is connected by the inclined spindle S with the arc sight; the spindle has a pinion on its end by which the sight is moved up or down in its socket through an angle equal and opposite to the angle of elevation. Formerly the range drum, on which the angle of elevation was read, was on the right of the gun, connected by gearing to the elevating wheel. With this arrangement the possible error in elevation was that due to the total back-lash of the four or five gears intermediate between the drum and the sight. With the 1910 arrangement the range drum (fig. 1) is on the sight itself, visible across the gun to the elevating number, and the only gear is that between the drum and the sight socket. But in this gear any possibility of back-lash is eliminated

[1] Colonel L. K. Scott, C.B., patented a similar sight in 1898, in which the sight was supported by a cam serving the same purpose as the Krupp gear.

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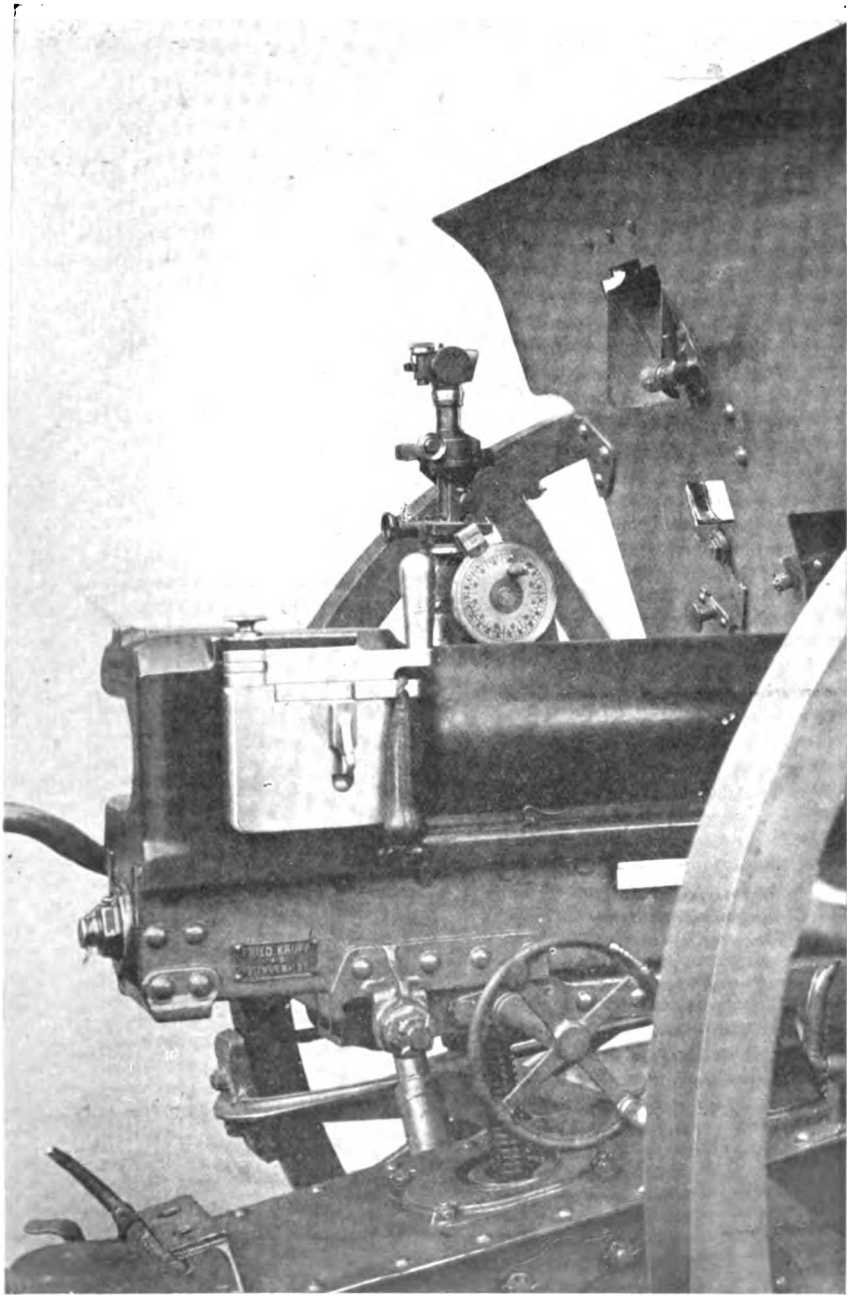

FIG. 1. Krupp Reciprocating Sight, 1910.

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by the use of a split pinion, divided into two halves connected by a helical spring.

Since the angle of elevation is read on the drum, and not on the sight-bar, open graduations on the latter are unnecessary. This enables the length and consequently the radius of the arc sight to be reduced, giving a more rigid and compact construction.

A minor improvement is the addition of a reflecting prism which enables the elevating number to see the bubble of the cross level from the other side of the gun. By reaching across the breech he can turn the cross-levelling screw and keep the sight levelled, thus enabling the laying number to keep his attention concentrated on the target.

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[To face page 182.

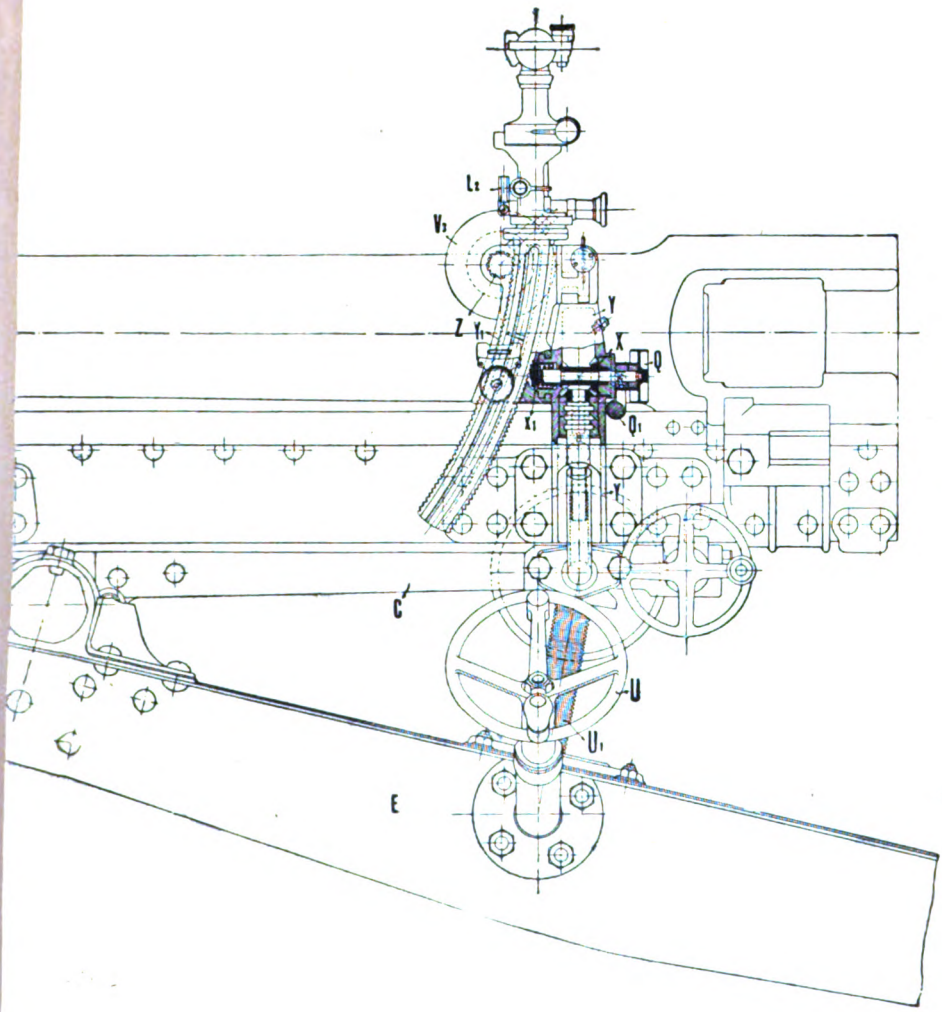

FIG. 3.

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An Appliance to enable laying to be carried out in a Drill Hall.

By CAPTAIN J. C. DUNDAS, R.A.

ONE of the difficulties encountered in training the 1st Highland Brigade has been the difficulty of teaching layers in the drill hall.

During the summer, laying can be carried on at night or on Saturday afternoons out of doors if the weather is fine, but in spring or during wet weather this is not possible. It has been found that owing to the position of the sights on the gun, it is difficult, even in a well lighted hall, to see the graduations on the range drum, and impossible to use the clinometer for indirect laying.

As many other units have probably experienced the same difficulty, a description of an appliance for remedying this defect, which was planned by certain officers of this Brigade, may be of interest.

The apparatus consists of a small dry cell battery (A) connected to two small electric lamps (B C). The former light (B) is attached by a clip (D) to the sleeve of the range drum. The second light (C) is fitted in a bracket (E) which is secured by a screw clamp to the telescopic sight in such a way that the lamp is directly beneath the longitudinal level of the telescopic sight.

Both lights are actuated by means of a small switch (F) situated on the right side of the bracket (E).

The battery (A) is carried in or attached to the telescopic sight case on the shield.

When the lights are turned on, the graduations on the range drum can be easily read, and the bubble is clearly visible in the mirror attached to the longitudinal level.

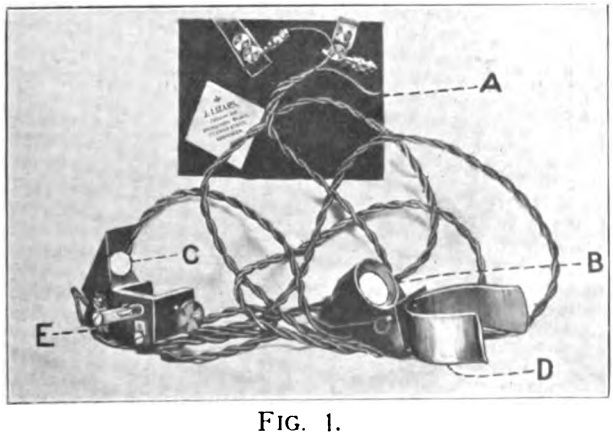

FIG. 1.

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Fig. 3 shows the sights when the lights are turned on. The graduations on the range drum can be read and the bubble seen in the mirror.

Although not primarily intended for the purpose, it seems possible that this appliance might be of value for night firing.

Any information in regard to the appliance, which costs but little, can be obtained from Messrs. Lizars, Union Street, Aberdeen, who worked out the details of the apparatus for the Brigade.

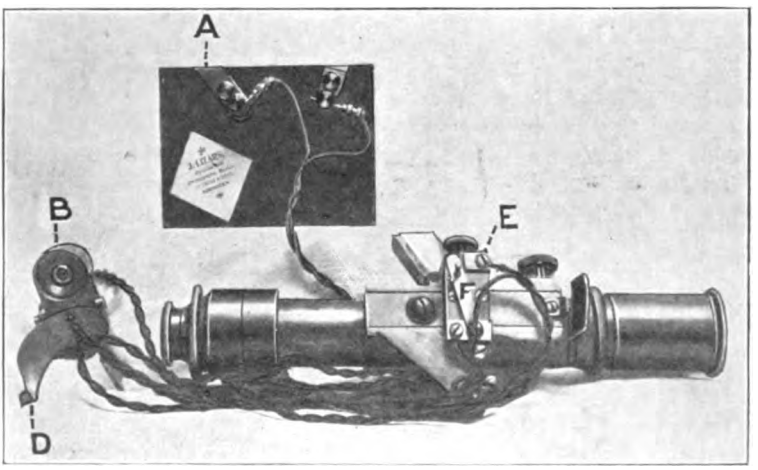

FIG. 2.

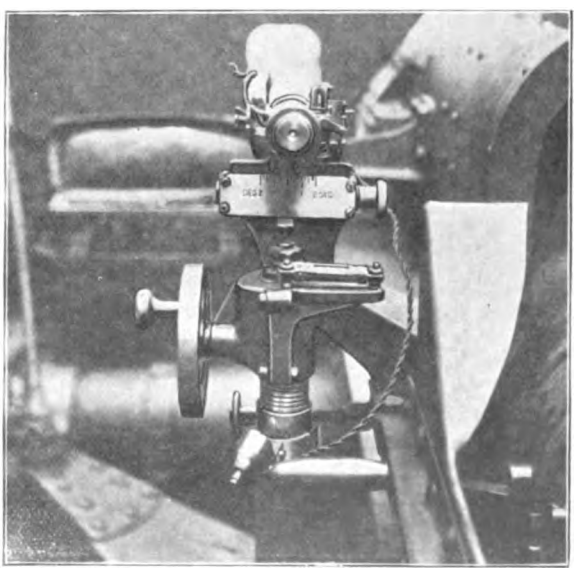

FIG. 3.

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"DUNCAN" SILVER MEDAL ESSAY, 1910.

"Q.F. Field Guns confer on Artillery Commanders a reserve of power which should be kept in hand."—("F.A.T." 1908, page 209). Discuss the principle in its application to the successive stages of the fight, treating reserve of power from the points of view both of *personnel* and *materiel*.

By MAJOR B. ATKINSON, R.F.A.

"C'EST L'ARTILLERIE DE MA GARDE . . . ."

FOREWORD.

IT may be said that the subject of this essay predicates nothing new; for, long before the era of Q.F. guns, the field artillery, or what corresponded to that branch of the service, had often been considered and used as a reserve. Without wasting too much space over historical detail, it is worthy of note that the greatest of all commanders, Napoleon, said: "It is the artillery of my guard that "decides most of my battles; for, having it always in hand, I can send "it wherever it is wanted." Even before his day, it was Frederick's artillery, used at the right time, that paved the way for his victories at Zorndorf and Rossbach, and saved his army at Hochkirch.

It must, however, be remembered that, during this period, the field artillery was, by reason of its immobility, more often a reserve of necessity than of intention.

This condition of affairs continued until the middle of the last century, by which time enhanced mobility had considerably modified the principles of field artillery action. For the next fifty years—that is, until the beginning of the present century—there was little idea of retaining field artillery in reserve.[1] Rather was it the ambition of every leader to bring a preponderating mass of guns early into action; and, with some regard to retaining sufficient ammunition for the critical phases, to employ its fire against favourable targets, or against unfavourable targets rather than not fire at all. It is possible to advance many arguments for this change of method. Chief amongst them was the short range of the rifle; also, the necessity of coming into action in the open rendered it dangerous—though the danger was probably overestimated—to bring up fresh batteries during the later stages alongside others already in action; lastly, the slower rate of fire rendered it unlikely that a battery would, in a single day, expend more than the amount of ammunition carried with it. Looking back

[1] The Prussian artillery in 1866 is, however, an instance to the contrary.

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over this period, it may be noted that the greatest number of rounds fired by a battery in any one day was 217 per gun by an Austrian battery at Königgrätz, and, in the 1870 campaign, there was not a single instance of a battery firing more than the amount of ammunition carried with it.

This early deployment of the field artillery was not without its advantages; and, having regard to the altered conditions, it worked just as well as did the former artillery reserve, which, be it repeated, was often unintentional. Thus the Austrian artillery saved its army at Königgrätz, although the guns themselves were lost. Another instance, and one which might be equally well quoted as illustrating the advantage of an artillery reserve, was Vionville, where the Prussians, attacking an overwhelming force with a succession of insignificant units, were all but lost when their artillery, moving up into the firing line, beat back the advancing enemy on more than one occasion.

It seems, then, that there need be no argument as to whether field artillery should be used as a reserve. Local conditions and the armament available will always be the dominant factors in the decision.

With the new century has arrived the Q.F. gun, which, with its appurtenances, bids fair to bring about important changes in the principles of artillery action. Its possibilities of rapid fire are only partially known, the only experience available for reference being the Russo-Japanese war, where the artillery weapons were by no means true Q.F. guns. Yet, even under this disadvantage, a battery fired no fewer than 522 rounds per gun in a single day; and an expenditure of 210 rounds per gun per hour is reported in this same campaign. Compare these figures with the solitary instance of 217 rounds per gun per day at Königgrätz, and it will be seen that the possibilities of the Q.F. gun are not without their attendant drawbacks.

Now, still considering the Q.F. gun as a weapon pure and simple, its special attributes may be summed up as follows:—

(a). Employing the same or a greater number of guns, and a lower rate of fire, it is possible to retain an enormous reserve of fire effect for the more critical phases of the battle.

(b). Employing a higher rate of fire, it is possible to produce the same volume from a smaller number of guns, and thus retain a reserve of actual units or "personnel."

The first of these attributes is somewhat facilitated by the greater number of guns now allotted to the individual formation.[1]

But, in both of them, and especially in the second, the difficulties of replenishing ammunition will be greater than ever they were before; and the danger of bringing up batteries close to others already in action in the open will be at least as great.

It will be seen, then that the Q.F. gun, *per se*, offers little more than the possibility of a very rapid rate of fire during the critical phases of the fight. In short, it calls either for scrupulous economy of ammunition during the earlier stages, or for an enormous increase

[1] This now amounts, in the Division, to 3·5 guns per 1000 men.

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of the ammunition columns, coupled with a sure and certain method of forwarding ammunition to guns in action in the open. This latter condition being, up to the present, unattainable, it may be laid down as an axiom that the Q.F. gun necessitates a reserve of what, according to the good pleasure of the reader, may be termed "materiel," ammunition, or fire effect. But, for a reserve of actual units, or "personnel," it offers little inducement.

What renders it so formidable is that, simultaneously with its adoption, have arrived appliances for firing by indirect methods. These appliances open up a far wider field than does the gun itself; for, with their aid, it is possible to retain batteries and brigades in reserve for all practical purposes, while still making almost the fullest use of their potentialities for fire effect. Furthermore, such batteries can be readily supplied with ammunition, and moved at will from one section of the battlefield to another.

In short, indirect fire is the complement of the Q.F. gun, and it alone enables us to make the fullest use of its possibilities. For, with its aid, we can now secure simultaneously a reserve of direct fire effect and a reserve of actual units. That is, we can now employ a proportion of guns in the open and, by limiting their rate of fire, retain a reserve of direct fire effect for the critical phases, while also obviating some of the difficulties of ammunition supply. At the same time, with the batteries under cover, not only can we retain a reserve of artillery units, ready to move to any threatened point, but we can also compensate for the smaller volume of fire from the batteries in the open during the earlier stages.

It would appear, then, that the Q.F. gun, with its accessories for indirect fire, facilitates, if not indeed calls for, some form of artillery reserve; and, furthermore, that this reserve may be of a two-fold nature:—

Reserve of fire effect—(materiel).
Reserve of actual units—(personnel).

GENERAL PRINCIPLES.

It is now possible to consider how these two natures of reserve can be best employed by an artillery commander in the field; and, before entering upon a discussion of the several phases of the fight, it will be economical of space to consider what, if any, general principles as to their employment can be laid down.

There will probably be little question as to the reserve of fire effect. That duty must fall to the batteries which may happen to be in position in the open. Firstly, because of their difficulty in replenishing ammunition; secondly, because until the day when fire from behind cover will be as rapid and accurate as fire from a position in the open—which day is probably not far distant—these batteries will be the best placed to take immediate advantage of favourable or fleeting opportunities. Such opportunities, as it happens, will generally offer themselves during the more critical phases; and it follows that it is for the critical phases that the reserve of fire effect must be retained. In other words, the batteries in the open should fire little

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during the early stages, and, even afterwards, their fire should seldom be directed on to targets which could be engaged equally well from behind cover. This limitation will include practically all standing and slowly moving targets. To facilitate, or rather to obviate, replenishment of ammunition, it will be well to consider in each case if local conditions render it possible to bring such batteries into action with a wagon on either side of the gun, with reserve numbers behind the wagon shields, and possibly with additional ammunition in pits and recesses.

The number of batteries to be brought into action in the open will depend on the nature of the country to be traversed by the infantry, on the character of the opposition, and on the intention of the supreme leader. Their distribution will be within the province of the G.O.C. divisional artillery. These points will be best discussed under the heading "Successive stages of the fight."

With regard to the control of this reserve of fire effect, it must be remembered that even a single brigade is not necessarily in action in the open in one long line, and that fleeting opportunities may not linger even for the space of a telephone message. Consequently, even the battery commander must be a judge of the necessity of control, and must regulate his rate of fire accordingly. Brigade, and higher commanders will, in gradation with their rank, possess a higher degree of responsibility for such reserve; but control will seldom be absolutely in their hands, and they will, as a rule, have to be content with general instructions.

The batteries under cover will provide a secondary reserve of fire effect; but, until the perfection of the appliances for laying indirect, their fire cannot be as effective during the critical stages as that of the batteries in the open.

The reserve of "personnel" will be provided: partly by batteries in absolute reserve—if such there be; and partly by the batteries in action under cover.

The batteries in the open will provide a secondary reserve of personnel; but once committed, their subsequent action must be so uncertain that the writer proposes to disregard them as a factor in this nature of reserve.

The number of batteries to be retained in absolute reserve must remain within the decision of the supreme leader. In the case of an army, it is probable that the general reserve will consist of at least a division. As the divisions in front line will, in most cases, possess sufficient guns to meet their individual requirements, the artillery of the reserve division, or divisions, will seldom be employed away from them, and will automatically provide an absolute reserve.

In the case of the division, its artillery commander must, failing definite orders to the contrary, be considered to have been given a free hand in the disposal of his batteries; and, remembering that batteries in positions of observation or readiness are, to all intents and purposes, capable of redistribution, an absolute reserve of guns will seldom be found within this formation; provided always that sufficient batteries under cover are in positions whence they can readily accompany, or co-operate with, any important movement. In

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this connection, the writer would—with great timidity—advance the suggestion that such movement need not of necessity take the form of a wide turning movement or flank attack.

In the absence of definite orders, the supreme leader must not, therefore, expect to find portions of the artillery of his front line divisions in absolute reserve.

The proportion of batteries to be brought into action under cover must remain within the decision of the G.O.C. divisional artillery. It cannot be left to the brigade commanders, for the following reason.

Taking the division as a concrete example, it might well happen that each brigade commander placed one of his batteries in action in the open and two batteries under cover, or *vice versâ*. The result would be a reserve of six or of three batteries; in the one case with three commanders; in the other, with no commander at all. Assuming now that an entire brigade was required for action elsewhere, it must, in either case, be assembled from different formations; and, in the second case, would be without a leader. However well its component batteries might work together, they could hardly be as efficient as an entire brigade commander by its normal leader; and, at the best, at least a portion of the peace training would be wasted. It therefore seems advisable that, not only should the G.O.C. divisional artillery regulate the proportions of his command to be employed under cover and in the open, but that he should be careful, whenever possible, to allot entire brigades to the various natures of position. In other words, the principle that the brigade is the tactical unit should be carried out in practice as well as theory. This is particularly necessary in the case of batteries in the open. Not only will they be lost to the G.O.C. divisional artillery for purposes of reserve of personnel; but, if no brigade commander accompanies them, the control of what must always be the more important form of reserve —fire effect—must be left entirely to individual battery commanders. It will, therefore, as a rule be better to allot an entire brigade to positions in the open, and thus to retain some semblance of control, rather than damage the entire field artillery of a division by committing fractions of each brigade. To recapitulate these general principles, which the writer now proposes to apply to the successive stages of the fight:—

(a). The reserve of fire effect (materiel) will be supplied, for the most part, by the batteries in action in the open.

(b). The reserve of actual units (personnel) will be supplied by batteries in absolute reserve, and by the batteries in action under cover.

(c). Without the definite order of the supreme leader, no artillery commander need retain an absolute reserve of guns.

(d). Officers commanding the artillery of divisions will be responsible for the proportions of guns to be under cover and in the open. They will, as a rule, find it profitable to allot entire brigades to the same nature of position. The proportions will vary according to local conditions. The solution will always depend on the answer to the question "Will fire from behind cover serve my leader's pur-

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pose as well as a possibly less accurate fire from positions in the open, which will, however, tend to divert fire from the infantry?"

(e). The above deductions tend to prove that, with the greater capacity of the Q.F. gun for fire effect and for expenditure of ammunition; with the greater mobility rendered possible by the employment of covered positions—which mobility renders it possible for the artillery commander to intervene with effect at any locality and during any period of the battle—it is more than ever necessary that the artillery of a division should be controlled by a single hand.

(f). This last deduction, if correct, is an argument against that sometimes necessary evil, the attachment of artillery to brigades for fighting purposes. For reserve, whether of materiel or personnel, such units are even more completely lost to the artillery leader than are his batteries in the open. No one is more convinced of the necessity of attaching brigades and batteries to infantry brigades and battalions than is the writer of this essay; but he desires it to be confined to that peace training which alone can produce effective co-operation on the field of battle. For service conditions, however, he would limit it to march formations, to cases in which the nature of the country renders it unavoidable, and to the rare occasions in which a force as small as an infantry brigade will, with a complement of the other arms, be detached from the main army for a specific purpose.

(g). Finally, before proceeding to the successive stages of the fight, the writer hopes that the broad terms of the subject of the essay may absolve him from dealing with the words "materiel" and "personnel" in their more restricted sense; and he would beg an indulgent reader to bear in mind that the underlying principle of this essay is that materiel—ammunition—fire effect—batteries in the open—spell one and the self-same thing, as do personnel—actual units—and batteries under cover.

THE SUCCESSIVE STAGES OF THE FIGHT.

In dealing with the successive stages of the fight, the writer feels that he cannot do better than follow the gradation adopted by General Haking in his lecture of the 19th November, 1908 ("Journal of the Royal Artillery," January, 1909).

1st stage.—Advance to within rifle range:—

Attack. During this stage, the infantry, if in comparatively small bodies, such as a single division, will be able to make full use of the ground, and will consequently need the minimum of support. If, however, it be in larger bodies, such as two or three divisions in front line, its freedom of manœuvre will be cramped; and, the formations being confined within the limits of their respective zones of attack, will often be unable to take advantage of natural cover. In such cases, as also in very open country, infantry will need a very considerable degree of artillery support. The degree will of course depend on the extent to which the defence decides to disclose its artillery positions. But, whatever the circumstances, it must be remembered

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that the attack will be exposed only to gun fire; in other words, to fire from what may be treated as standing targets. And as standing targets can, as a rule, be dealt with as effectively from concealed positions as from the open, it follows that, during this stage, the normal position of the attacking batteries will be under cover; and that, therefore, a large majority of the artillery of the attack will remain in practical, if not in absolute, reserve.

To this enunciation there are, however, two important corollaries. Even during this stage, it may be found possible, by reason of the nature of the country, or of the supineness of the defence, to bring batteries into action in the open within effective range of the main hostile position. An attempt to do so may often prove successful; for, up to this point, the defence can have, or should have, little idea as to the exact direction of the main attack; and furthermore, its batteries may be tied down by restrictions as to their opening of fire. The defence may, therefore, be, in some measure, unprepared; and the attack should be alert to seize any advantage that may offer during this period. But, should it bring batteries into action in the open, it must be remembered that they will, in most cases, have a long day's fighting before them, and that they should, therefore, be amply supplied with ammunition from the start. Such opportunities should, in the writer's opinion, be seized without hesitation; for they may save much of the loss which is almost inevitable in advances across the open during the later stages.

As the G.O.C. divisional artillery cannot be in every section of the battlefield, these opportunities must be seized on the initiative of brigade commanders, which is another argument in favour of allotting entire brigades to the same nature of position. During the early stages even commanders of brigades allotted to positions under cover should take such action; but they should at once report it to the G.O.C. divisional artillery, as he may still be in a position to bring such departures into harmony with his general scheme of action.

The second corollary is that, should the artillery of the defence abandon all idea of concealment, and open with unexpected vigour, it may become necessary to bring batteries into action in the open, whatever the nature of the ground, so that they may divert fire from the sister arm. This the writer considers to be the most real and, as a rule, the most effective form of support; and a form which will become more and more necessary with each successive stage of the fight.

But, with the above exceptions, this first stage should have little influence on the artillery of the attack, considered as a reserve.

Defence. With regard to the defence, it is possible that here the Q.F. gun enjoys its most favourable opportunity of producing the same volume of fire from a smaller number of guns. Assuming it to have been possible to prepare positions beforehand, and to provide sufficient ammunition, a section will be able to accomplish what has hitherto been the function of a battery. This will permit, not only of the formation of a reserve of fire effect, but also of a reserve of a greater number of units than has hitherto been possible, even for the defence. Guns in open positions may of course be concealed by

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artificial means, and, according to local conditions, may be restricted as to their opening of fire; but it must be borne in mind that it is only by effective artillery fire that the attack will, during this early stage, be compelled to expose batteries in order to divert fire; and, therefore, it will, as a rule, be advisable for the defence, with its advantages of entrenchment, shield, and ample ammunition, to open fire early with a view to committing the attack to an action which amounts to surrendering a portion of its artillery reserve.

Artillery may be an auxiliary arm, but it is just as subject to the recognised rules of warfare as is the remainder of the army. One of these rules runs to the effect that the reduction of the enemy's reserve is almost as important as the retention of one's own. By the adoption of the Q.F. gun and appliances for indirect fire, manœuvre to this end is now rendered possible during every stage of the fight; and, just as is the case with infantry, the commander who first induces his opponent to commit his final artillery reserve, be it fire effect or actual units, will have gone a long step towards victory.

As, however, infantry moves slowly, and, even under present conditions, can be engaged with effect from concealed positions, it will not, as a rule, be necessary for the batteries in action in the open to disclose their positions during this stage. The numbers of such batteries will, therefore, depend mainly on the nature of the country to be traversed by the attacking infantry between coming under effective rifle fire and reaching a distance of some 500 yards from the main position.

As with the attack, they will constitute the main reserve of fire effect.

A point worthy of consideration is the exact stage at which they should be brought into action. In the opinion of the writer, the Q.F. attribute of producing equal volume from smaller numbers should be employed at once; for fleeting or favourable opportunities may present themselves to the defence from the very commencement of the action. For such opportunities, even a section will often prove sufficient. The bulk of the reserve of fire effect should be brought into position as soon as the direction of the main attack is definitely known; for, during the later stages, the defence may find it exceedingly difficult to bring batteries into action in the open. Against its prepared positions it must oppose the fact that it can bring up its batteries only within defined and recognised limits, while the attack enjoys a field limited only by the effective range of the guns. And furthermore, despite the recent partial abandonment of elevated positions, the defence will, more often than not, have such rising ground behind it as will necessitate exposure of the units during their advance.

On the other hand, the attack will possibly have few guns in the open during this stage, so that it may be possible for the defence to bring batteries into open positions even during the second stage. The decision must, as is nearly always the case, depend on local conditions; and, as a general principle, it can only be said that this first stage should be used by both attack and defence to build up their reserves of direct fire effect.

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2nd stage.—Infantry advance to final fire position:—

Attack. During this second stage, the infantry will be exposed to the fire of both artillery and small-arms, and will need a correspondingly greater amount of support. The attacking guns will now, for the first time, find infantry targets; but these targets will be stationary, and can be engaged almost as well from concealed positions as from the open. The time for fleeting or favourable opportunities will not be yet; and, were it not for the contingencies now to be enumerated, there would, during this stage, be little reason to draw on the reserve either of fire effect or of actual units. The nature of the country to be traversed by the infantry must, however, exert an almost determinant influence on the character and degree of artillery support to be afforded. If the country be open, it will be necessary to cover the infantry while crossing exposed slopes. During such advances, it may sometimes happen that aggressive sections of the defensive position commanding such slopes cannot be seen either from the batteries under cover or from those brought into action in the open during the first stage. In this case it will be necessary to push other batteries boldly into the open to beat down, or to divert the hostile fire. The number of batteries to be so employed must depend on the particular case, remembering always that the infantry must be enabled to advance without being seriously checked. The number will be less or greater according to the efficiency of the preliminary reconnaissance, and to the forethought for such contingencies with which batteries have been brought into action in the open during the previous stage.

If, on the other hand, the country be close by reason of woodland, fencing, or minor undulations, the defence may have secured its front by a number of what may be termed "localities." In this case again, it will be necessary to deplete the reserve of actual units, or even to hand over batteries or brigades to the minor formations. Such localities will most certainly be selected with immunity from long range artillery fire; and they will often be invisible except from close ranges. They will thus tend to produce more serious checks than mere open slopes; and their speedy capture may demand a considerable degree of artillery support.

During this, as in the first stage, opportunities may arise for bringing batteries into action in the open within effective ranges with comparative immunity; and the attack must be prepared to take instant advantage of them. Such batteries will naturally contribute far more to the reserve of fire effect than will those which have been pushed into the open of necessity; for these latter may find themselves in positions ill-adapted for any action beyond their primary objective; and they will seldom have been able to bring up additional ammunition in the form of extra wagons.

Whatever the case, batteries sent into action in the open during this stage, should be taken, whenever possible, from brigades which sent units into similar positions earlier in the battle.

Defence. The defence will, by this period, have divined the attacker's intention with some accuracy. Being more or less tied to

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its position, it will not require a large reserve of actual units. Therefore, while allowing for the counter-attack, it should, during this stage, complete its reserve of fire effect. In other words, it should bring into action all guns intended to occupy positions in the open during the battle; for, in the face of an artillery presumably superior, it may not be able to do so later on. Indeed every available gun should be now in action; for, as the attacking infantry approaches its final fire position, the advantages of the defence must begin to disappear. The principle should, however, still hold good that stationary and slowly moving targets should, as far as possible, be left to the batteries under cover; those in the open dealing with fleeting opportunities, which, by now, will occur with ever increasing frequency. In addition to greater facilities for supply, the defence will not need to be as economical in its expenditure of ammunition as will the attack; the reason being that, once the attack has established a firing line at close quarters and has developed approximately equal infantry fire effect, the artillery of the defence can no longer be regarded as a deciding factor in the result. Indeed, by permitting the attack to establish such a firing line, it must already stand responsible for a certain degree of failure.

To summarise this stage, it may be regarded by both attack and defence as the period during which they complete their reserves of fire effect; but, while the defence will at once begin to draw on this reserve, the attack will most probably retain it for the third and deciding phase.

3rd stage.—The struggle for superiority of fire:—

Attack. Until this stage, the attacking infantry will have suffered to some degree from what may be termed the passive offensive; but, from this point onwards, it will begin to hold its own. It will have reached an irregular line varying in distance from the hostile position at any thing from effective rifle fire to point blank ranges. The vulnerable points of the defence will, as a rule, be opposite those places where the attack has gained most ground; the sections of the fire positions which are little inside effective rifle range will probably develop into minor holding attacks, and will need but little artillery support. By previous reconnaissance, and by observation during the earlier stages, the artillery commander should, before this, have gained a good idea of what the general line of the final fire position is likely to be. Should he have done so, he will have been able to lighten the task of his batteries and of the infantry by having, during the earlier stages, brought his batteries in the open into positions suitable for engaging the vulnerable points of the defence. Should he have failed to recognise these points, he will, during this stage, be forced to draw on his reserve of actual units for the reinforcement of his reserve of direct fire effect. For it is just at these points, which imply close country, and where the opposing forces are in close contact, that the fire of batteries under cover will lose a portion of its value. In this connection he will have to remember that batteries coming into action in the open during this stage will not provide so effective a reserve of fire effect as will those already in position; for

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they will hardly reach their fresh positions unmolested, they cannot count on bringing up extra wagons, and they will have had no opportunity of taking the ranges to their objectives. It is, therefore, possible that, during this period, two batteries will have to be brought into action in the open where one would have sufficed had it been in position beforehand. Another argument for the early formation of the reserve of direct fire effect.

Lastly, it may, even during this stage, become necessary to sacrifice guns or batteries in order to divert fire from the sister arm.

With these exceptions, the principle will hold good that stationary targets should, whenever possible, be engaged by the batteries under cover, some of which must be held in readiness to meet the now impending main counter-attack.

The batteries in the open will, from now onwards, find increasing numbers of favourable and fleeting opportunities, such as local counter-attacks and the movement of supports to the firing line. Economy of ammunition need no longer be so urgently considered; for this is the decisive stage of the battle, and one requiring a greater degree of artillery support than does the actual assault.

Defence. The action of the defence will now depend on the location of the final fire position of the attack. If it has permitted this position to be established at close quarters, it may already be regarded as having failed. For, either its fire action must have been at fault, or its position badly chosen. The two sides will now be fighting on practically level terms; for what the defence may gain from entrenchment previously prepared, it will forfeit by the fact that its position has been practically unchanged throughout the fight. It will thus offer well defined and well-known targets to the infantry and artillery of the attack. Under these conditions, its artillery reserve, either of fire effect or actual units, will become relatively unimportant; for the final fire position will probably be at too close range for either to be used with effect. Under these circumstances, the only course will be to assemble the infantry reserves behind the threatened points; for, except when enfilade is possible, the artillery will be able to deal only with the more distant portions of the fire position, and prevent them from developing from holding into main attacks. The batteries in the open will only be able to stave off the evil day; for the attack, which will have reached the final fire position in the face of many disadvantages, may be assumed to be in numerical superiority; and, having, according to the preceding pages, economized in direct fire effect to a greater extent than has the defence, will be able to develop sufficient volume to counteract their fire.

The reserve of actual units; that is, the batteries under cover, may also, in some cases, be able to enfilade the attack, and should do so without regard for ammunition. But the remainder will be best employed in taking up a covering position; for the battle is already lost.

If, however, the defence has compelled the attack to occupy a distant fire position—in other words, a false fire position—it is evident that it has gained its immediate objective. In this case, it will still

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be necessary to maintain reserves of fire effect and actual units; and, as long as these be unexhausted, the battle will not be lost. The principles of the earlier stages will still hold good, batteries in the open firing on favourable opportunities, those under cover on stationary and slowly moving targets. As this is the decisive stage, to hold the enemy at a distance should be the first consideration rather than economy of ammunition.

4th stage.—Assault. Pursuit. Retreat:—

Attack. The assault is usually regarded as a separate phase; but, in the humble opinion of the writer, it is little more than the culmination of the struggle for superiority of fire. If the attack has succeeded in reaching a final fire position at close quarters, it will usually succeed; if the converse, it will very possibly fail. Furthermore, as a stage it cannot be timed with certainty; and will, as often as not, develop from the spontaneous action of a close-range section of the final fire position. The individual in such a section will often be a better judge of the time for assault than the supreme commander himself. If the assault delivers itself, it will, as a rule, be the result of proper preparation, and will usually succeed. If, on the other hand, it is by order, it may be premature, and so run risk of failure; it will almost certainly fail in places.

It follows then, that the timing of the assault, and the location of its starting point, must be so uncertain as to render nugatory any attempt at definite rulings as to the action of the artillery reserve.

But one thing is certain; which is that, by this stage—if a separate stage it be—the artillery commander should have been able to foresee that the assault will first take place at one or two of a limited number of points; and, if he has done his duty during the previous stages, his reserve of direct fire effect will have been so placed as to be capable of concentration on these points. The necessity of bringing further batteries into action in the open at this period can, therefore, only be due to miscalculation during the earlier stages.

What reserve of fire effect may be left over from the struggle for superiority of fire may now be expended in the endeavour to convert defeat into rout; this task will become the main duty also of the reserve of actual units. The absolute reserve, if such there be, will by now have been moved to positions favourable for taking part in the parallel pursuit. Of the batteries under cover, some will be told off to the parallel pursuit; others, as their fire becomes masked by the advancing infantry, will prepare to advance on to the captured position.

The batteries in the open will have done their duty and, after filling up, will follow in reserve.

Defence. In the case of the defence, the battle will, as a rule, be lost before the actual assault is delivered. It will, however, have this advantage, that it is in a position to estimate how close its resistance is to breaking point. Its artillery will no longer be of the first importance, and its reserve of actual units will be best employed in

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securing a widely extended covering position whence it can prevent defeat degenerating into rout, and ward off the parallel pursuit. Should it succeed in doing so, it will have accomplished far more than had it followed the glorious but somewhat extravagant custom of sacrificing its guns.

THE BATTLE OF ENCOUNTER.

Before concluding, mention may be made of an important phase of warfare which, presumably pre-supposing supernatural cavalry and immaculate advanced guards, the drill books have been, until recently, somewhat inclined to ignore. It is what our Continental neighbours have learned, by bitter experience, to term the battle of encounter.

As is pointed out in "Field Service Regulations" (Part I, para. 111), the general strategical situation will usually decide which side is to assume the offensive, and which the defensive. But, given no great numerical disparity, the preliminary phases may sometimes degenerate into a race for a good position more or less equidistant. The character of the neighbouring country may thus also prove a decisive factor in the battle of the encounter; and in this case, either side will be in some uncertainty as to its ultimate action. The result may be, according to local conditions, either a gradual dribbling in of force, or a bold deployment of all available units. Under these conditions it is impossible to legislate for the formation and action of the artillery reserve. It is probable that, by the periods that the rôles of attack and defence are definitely allotted, both sides will have a proportion of batteries in the open, without additional ammunition, and, consequently, contributing less than their real value to the reserve of fire effect. But, afterwards, the general principles already enumerated will hold good, and the remainder of the battle will be fought on normal lines.

CONCLUSION.

In conclusion, the writer would apologise for this very disjointed production, much of which has, on the surface, little to do with the employment of the artillery reserve. It amounts merely to a plea for the control of the artillery by a single mind. Appliances for indirect fire and the Q.F. gun now render it possible for the artillery to intervene with effect during every minor stage, and at every minor locality of the battle. It will, henceforth, be no longer sufficient to allot to each brigade a strip of country for positions, and another strip of the hostile position as a target; and then to leave the brigade commanders practically free to co-operate according to their individual ideas. Instead of large numbers of batteries committed haphazard—for though allotted definite battle rôles in theory, they are, in practice, limited to the bombardment of a section of the hostile position—there will, under the new conditions, be a constant dribbling in, now of reserve of fire effect, now of reserve of actual units. A battery to hurry the infantry through this locality, a section sacrificed to extract it from that impasse; a brigade to beat back that counter or flank-attack, every gun to assist in the struggle for superiority of fire.

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The ideal would be that all this should be accomplished by the G.O.C. divisional artillery. Thorough preliminary reconnaissance would facilitate the establishment of his reserve of fire effect in positions whence it could assist the infantry to an unchecked advance to its final fire position, and afterwards aid it in the struggle for superiority of fire. Correct appreciation of the artillery situation would result in the true apportionment of the batteries to the reserves of fire effect and actual units.

All this is, admittedly, a counsel of perfection, which can seldom, if ever, be attained in its entirety. Efficient reconnaissance and observation may be impossible; so that one stage will possibly overlap another. The attack may be preparing for the assault in one section of the field, while, in another, it has not even reached the final fire position. Much must depend on the action of the enemy; more must be left to the initiative of the brigade commanders. The G.O.C. divisional artillery must, therefore, be ever prepared to deal with the unforeseen; for unexpected developments will be continually interfering with his plan of action.

But, as long as he, in person, is in absolute control of a reserve, be it fire effect or actual units, he will still be in a position to assist his commander to victory.

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The Proposals for a National Army for Great Britain.

By COLONEL A. KEENE, D.S.O., R.A. (retired).

IN a recent number of the "Journal," reference was made by Lieut. K. B. Ferguson, R.G.A., to the necessity for national military service in the United Kingdom, and it will no doubt interest officers of the Regiment if a short sketch is placed before them of the actual proposals now before the country for introducing universal, and therefore, necessarily compulsory military training.

These proposals, and the principles on which they are based, are clearly stated in Leaflet A. of the National Service League, of which Lord Roberts is the President.

Principles:—

1. That it is the duty of every able-bodied man, high or low, rich or poor, to defend his country in case of national danger.

2. That to perform this duty efficiently he must be trained in time of peace.

Proposals:—

To secure the practical adoption of these principles, the League advocates that, subject to certain exemptions to be defined by law, including those necessary to provide for the requirements of the navy, the regular army, and the mercantile marine, every man, of sound physique, without distinction of class, shall be legally liable during certain years of his life to be called upon for service in the Territorial Force, for Home Defence only.

In order to fit him for this duty we urge that, subject to the exemptions indicated above:—

1. One continuous training of four months for the infantry (with longer periods, not exceeding two additional months, for the other arms) shall be compulsory for all able-bodied youths in this country between the ages of 18 and 21, without distinction of class or wealth. Such training shall be followed annually for the next three years by (a) a fortnight's training in camp in the ranks of the Territorial Force, (b) a musketry course, with such furtner drills as may be prescribed for that force.

2. The men thus trained shall be liable, up to the age of 30, to be called out for service in the Territorial Force, for Home Defence only, at a time of grave emergency so declared by Parliament.

Combined with the above system, as much physical drill and military instruction as possible should be given to all boys previous to their reaching the military age, as part of the curriculum in all schools.

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The National Service League welcomed the Territorial Force when it was launched, and has consistently endeavoured to make it a success, for it recognises the great superiority in organisation and capabilities that this force provides as compared with the old Volunteer Force.

The League, however, feels bound to point out two fatal defects inherent in the force as at present constituted:—

(i.) Insufficient Training.

(ii.) Want of numbers and of power of expansion.

The Territorial and Reserve Forces Act provides that the Force shall, on the outbreak of war, be mobilised for six months training; the training in time of peace being inadequate. The National Service League contends that the training for war should be carried out before, not after, the outbreak of hostilities. This can only be done if training is universal and compulsory.

It may safely be assumed that the "Principles" above stated will be accepted by readers of this Journal, and we can proceed at once to the "Proposals."

In the first place, it is essential to note that these proposals in no way affect the present constitution of, or methods of recruiting for, the Navy or the Regular Army. The normal conditions existing in these two services demand that any man who enlists in either shall not only be ready to start for the uttermost parts of the earth at a moment's notice, but they actually force him to spend much of his service beyond the bounds of the United Kingdom.

Again, the numbers required for the Navy and the Regulars are comparatively small, and various conditions well known to soldiers and sailors render it necessary that the period of engagement shall be comparatively long. Neither of these considerations is compatible with compulsory service, the leading features of which are that it gives very large numbers, and that these large numbers can only be kept under training for relatively short periods.

On this point we must be content to take the ruling of the great historian of the British Army, the Hon. J. W. Fortescue, who in summing up the lessons of the great struggle between this country and France, between 1793 and 1815, says: "Compulsion cannot be applied for service abroad." It is true, indeed, that in the Seven Years' War, and again, partially, in the wars just referred to, men were forced into the Regulars and made to serve abroad, but this compulsion was applied to broken debtors, malefactors, poor boys thrown on the parish, and others in similar unfortunate positions, but the democratic spirit of modern days would never tolerate such partial compulsion. It is the very essence of the spirit of the modern "Nation in Arms" that the compulsion shall fall equally on all.

Coming to details, it may be assumed, from the study of the Swiss and Norwegian systems, which are taken as models for home-defence militia forces, that on nearing the age of 18 a British lad, resident in the United Kingdom, would receive, probably from the Parish Authorities, a paper summoning him to attend at a certain spot on a certain day for examination previous to his training. On arrival at the place indicated, the lad would be introduced to a small committee of three officials, one of whom would be a civilian, empowered

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to take oaths, who would take evidence as to the lad's age, his trade and previous teaching, and his character.[1] This official would also satisfy himself that the young man was not serving in the Navy or the Regular Army or the Mercantile Marine. The next test would be the physical one, which would be carried out by a medical officer, and when he had passed that the lad would be seen by a military officer who, forming his opinion on the lad's general physique and his previous trade or training, would post him to that branch of the Territorial Force in which he would be most likely to do the State the best service.

It would probably be convenient after this inspection to hand to the new recruit a paper telling him the branch of the service for which he was selected, and directing him at the same time to attend for training at a certain depôt, on a certain day.

These depôts would be similar to those at which the training of the Special Reserve is now carried out, and the training staff would be similar; that is, it would be composed of officers and N.C.O's from the Regular Forces. They would also be open all the year round, so that men of different trades could attend at the time of year best suited for them, *e. g.*, Undergraduates from the Universities might put in their training during the Long Vacation; builders, bricklayers, and agricultural labourers, during the winter months, when the land sleeps and building is at least partially suspended.

The four or six months training at the depôt would be all the service demanded in the first year, and would count as the first of the four years compulsory service in the Territorial Force. At the end of the training, the recruit, now thoroughly instructed in a soldier's duties, would be posted to a convenient unit of the Territorial Force, and would belong to that unit for the next three years.[2]

Imagine the delight of a really keen and efficient commander of a Territorial unit when, at the beginning of each year, he found his unit reinforced and brought up to full strength by a draft of well-drilled young soldiers, not one of them under 19 years, the pick of the population of his district. Picture to oneself what those recruits would be like—alert, well set up, inured to discipline, trained to march and to shoot and to dig; think of what their physique would be. According to the Anthropometric Committee of the British Association, the *average* British youth of 19, the very man of whom we are speaking, is 5 ft. 7·29 inches in height, has a chest measurement of nearly 35 inches, and weighs close on 10 stone. At this rate every Territorial battalion would be composed of men approaching in physique to the stamp of men found in the ranks of the London Scottish and other crack Territorial Corps. And it must be remembered that among these men would come in youths from every class in the Kingdom—every art and every science, every trade and every handicraft would be represented,[3] and that if proper instruction in

[1] Bad characters would not be allowed to serve.

[2] If compelled to change his place of residence, the youth could easily be transferred to a unit in the area of his new abode.

[3] At present it frequently happens that a recruit, choosing his own unit, deliberately selects one in which the work will be novel, *e. g.*, a medical man will ask for a commission in a field battery, in order to get a change. This would be all very well if soldiering in the Home Defence Army was a sport, for the amusement of the individual, and not essentially a serious duty, undertaken for the benefit of the State.

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Empire and patriotism had been given in the schools, every lad would enter the ranks of the National Army with a spirit at least as high as that which animates the Territorial of the present day.

For three years, then, the young citizen, now thoroughly trained in a soldier's duties, would remain in his unit, and during these three years he would be compelled to do as many night drills, or Saturday afternoon drills, as might be prescribed, as well as his course of equitation, musketry or practice camp, *and* his fifteen days of annual camp training. Many soldiers will cry out that the training proposed is inadequate, but those who do so must remember that that is a very great advance on what is now being done. And before they do cry out against such short training, let them go to Switzerland in September and see the Swiss army at its annual manœuvres. Let them at the same time enquire exactly how much training the Swiss soldier gets, and they will find that it works out to much the same as that proposed by the National Service League.

Under the proposals we are now examining, on the arrival of his trained recruits, the commander of a Territorial unit would pass on to the Reserve those of his men who had completed their engagements,[1] and the men of this Reserve would remain liable for service in the United Kingdom, at any time " of great emergency so declared by Parliament, up to the age of 30 years.

It will be seen, therefore, that the position of the Territorial officer would be greatly improved by the introduction of National service—he would be freed from all the petty worries connected with catching the recruits for his unit, and of coaxing them to come to parades for training.

Numbers for Annual Training:—

The number of men who would be trained annually under the proposals of the League has been worked out as follows:—

The number of lads reaching the age of 18 in any one year in the United Kingdom is (according to the census of 1901) about	416,000
In estimating the number who would come up for annual Recruit Training we must deduct:—	
48% for medical rejections and legal exemptions	200,000
Recruits for Navy and Marines	8,000
Recruits for the Regular Army	35,000
Emigrants	10,000
Mercantile Marine	15,000
	286,000
Leaving to be trained each year ..... (Say 150,000)	148,000
	416,000

[1] Section 9 para. (2) of the National Service Bill specially provides that "nothing in this Act shall affect the terms or conditions of service of any person who "is a man of the Territorial Force at the commencement of this Act."

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Officers who have had anything to do with recruiting will not require to be told that the rejections for physical unfitness will be very large. As to exemptions, they are laid down in the Schedule to tne National Service Bill, and apply only to those who have served not less than three years in the Navy or Regular Forces, or done three years service in any police force in the United Kingdom; to the only sons of widows, the mother being dependent on the son for her support, and to ministers of religion of any denomination. Criminals, habitual drunkards, and bad characters, are disqualified from serving, as it is not desirable that the young lads called out for training should suffer by association with them.

As to the other exemptions in the table given above—in a crowded country like ours, and with our Daughter Nations calling aloud for population, it would be stupid to interfere with those who really desire to emigrate, and it would be just as foolish to handicap, in any way, the Mercantile Marine, on whom we depend for so much of our food, and of the raw materials for our manufactures.

Training Staff:—

(c). The number of Regular Officers and N.C.O's required to supervise the five months training is taken at the following, per 1000 men:—

One Commanding Officer; two Majors; ten Captains; one Adjutant, and one Quartermaster.

Making a total of fifteen officers of various ranks, but practically all above subaltern's rank.

N.C.O's:—Five Staff-Serjeants; ten Pay Serjeants; twenty Serjeants, and forty Corporals.

Making a total of seventy-five N.C.O's of all ranks.

(d). The number of Territorial Officers employed in the five months training is taken at 20 per 1000 men, all of whom would be subalterns. Opportunities would no doubt be given to Territorial officers of higher ranks to serve, but in this case they would practically have to be treated as Regulars, and would come, therefore, under *(c).*

It is estimated that of the 150,000 recruits to be trained in each year, 138,000 would be combatants and 12,000 would be departmental troops; and, on the allowance above given per 1000 men, there would be required altogether for the training of 138,000 combatants, 2070 Regular Officers. 10,350 Regular N.C. Officers and 2760 Territorial Officers (Subalterns).

Officers of the Regulars will see at once what a tremendous fillip would be given to recruiting for the Regular Forces if it were known that there were well over 10,000 good billets going for N.C.O's, billets in which men could serve at home, and in which a man could marry and settle down, for there need be no movements in relief in these billets.[1]

We see, then, that for every company of 100 men we should have

[1] Economically it would be an immense gain to the nation that men of good physique, such as these 10,300 N.C.O's, should be enabled to marry and bring up families. At present we enlist annually 35,000 men, all of them of sound physique, and by the conditions of their service few of these can ever hope to marry, while there are practically no restrictions on the marriage of physically unsound civilians.

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one Captain, two Subalterns, two Serjeants, and four Corporals, all of them Regulars except the Subalterns; and the periods of training would be four months for the infantry and six for the cavalry and artillery. The success of the training now given to the Special Reserve, a training very similar to that proposed by the National Service Bill, gives great reason for hope that the recruits on joining their Territorial units would be adequately trained, and ready to go at once to field training as units.

Numbers of the Home Defence Army:—

Under the assumptions already given regarding the numbers actually available each year for training, there would be, in the fourth year after the scheme had come into operation, and allowing 5% for wastage, the following numbers:—

Recruits' Training		150,000
Training in Territorial Force	1st year 142,000	
	2nd year 135,000	
	3rd year 128,000	
		405,000

In subsequent years, these numbers would be swollen by the passing to the reserve of about 120,000 well trained young men of about 23 years of age, these young men remaining liable to be called out, in case of great emergency, till they reached the age of 30.

It will be noted that the National Service Bill does not include recruits in the Territorial Force that is to be raised under its proposals—the inclusion of recruits in the numbers of the present Territorial Force is, in a military sense, quite unsound, for it only imposes on the British electorate, and not on our possible antagonists, who know that recruits should not be allowed to participate in Annual Manœuvres, and are quite out of place in actual fighting.

Cost:—

The cost of the proposals of the Bill we are discussing has been worked out by experts of the National Service League on two separate bases of calculation,[1] and in each case it appears that there would be an annual addition involved of £4,000,000 above that of the present Army Estimates.

The calculations have been disputed by the War Office, so we will take instead a third calculation, based on figures emanating from the War Office itself. It is worthy of note that this yields the same result as that arrived at by the National Service League, viz., an additional cost of four millions.

In Mr. Arnold Forster's White Paper (Cd 1909 of 1904) it is stated that the cost of training 190,000 men for one year would be £13,765,000. From this it follows, by a rule of three sum, that the cost of training 150,000

[1] The "Estimates of Numbers and Cost" can be obtained from the Head Offices of the National Service League, 72, Victoria Street, London, S.W., price 1d. each.

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men for a period of five months would be £4,527,960

According to the reply published by the War Office to the National Service League "Estimate of Numbers and Cost," the gross cost of the Territorials is £10 per head per annum.

The increase in the numbers of the Territorials by the adoption of the League's scheme would be 92,000 men, *i. e.*, 405,000, as against 313,000, the present establishment of the Territorial Force.

This gives an additional sum of £920,000

There must be added in addition a bounty of £1/10 to each of 80,000 of these Territorials to induce them to undertake liability to serve abroad with the Regulars in case of war £120,000

£5,567,960

Deduct cost of Special Reserve..... £1,301,665

£4,266,295

In Mr. Arnold Forster's White Paper it is stated that the pay of a recruit has been reckoned as 1/- per diem. The rate of pay for recruits in the scheme of the League is 6d. a day less than that given to Regular soldiers.

Now the present pay of the Regular soldier averages about 1/3 per diem. The pay of a recruit would consequently amount to 9d. per diem, *i. e.*, 3d. a day less than is allowed in Mr. Arnold Forster's calculations.

Threepence a day for 150,000 men for five months works out at £281,20.

Deducting this sum from our previous result, we get a final total of £3,985,045 as calculated from War Office figures.

The estimates prepared by the League yield the following results:—

Estimate A. £3,859,199.
Estimate B. £3,806,372.

Soldiers have no politics, and the pages of the "Journal of the Royal Artillery" are not suited for the introduction of contentious matter. An attempt has, therefore, been made to avoid argument as much as possible, and to confine this paper to a bald statement of the proposals now before the country. It is true that, owing to a clash of opinions on other matters, it has not been found possible to bring forward a National Service Bill in the House of Commons, but in the serener atmosphere of the Upper House, the National Service Bill received careful discussion on July 12th and 13th last year; we may thus say that the subject is before the country, and that the time has come for the close study of it by the officers of the army generally.

Before closing this paper it seems due to the great soldier who introduced the Bill into the House of Lords to show that the proposals of the National Service League are based on solid ground. The

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Hon. J. W. Fortescue, the writer already referred to, has devoted many years of his life to the study of one subject only, *i. e.*, the history of the British Army. As a supplement to that work, he has written a separate book called "The County Lieutenancies and the Army, 1803-1814." This is simply a study of the recruiting question, and of the enormous difficulties it presented during the Titanic struggle of the Napoleonic Wars. The lessons Mr. Fortescue deduces from that study are as follows:--

"England cannot, any more than any other nation, fill the ranks "of her army in a great war without compulsion."

"Compulsion cannot be applied for service outside the British "Isles."

"The admission of the principle of substitution in any scheme "of compulsory service leads to ruinous expense, demoralisation, and "inefficiency."

"Compulsory personal service for Home Defence has been tried "and not found wanting."

"The ultimate end for which all our military organisation must "exist is the maintenance of our Regular Army, our only offensive "land force."

"The true basis of such an organisation is National Training."

It is, to put it mildly, very remarkable that, approaching the subject from an absolutely distinct point of view, Mr. Fortescue should have tabulated a series of propositions which tally with, and confirm, the proposals of the National Service Bill of 1909.

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Gun Trials in China.

By CAPTAIN T. C. LEAH, R.G.A.

IN the January number of the "Journal of the Royal Artillery," an article of mine on "Gun Trials in China" had the honor to appear.

I have since then been fortunate enough to obtain detailed information of the objections of the Chinese Government to the Vickers Maxim guns, and details of the guns which Messrs. Krupp and Schneider produced for trial, and think that these might not be without interest to the readers of the "Journal."

I have to acknowledge my indebtedness to several of the Language Officers in Peking, by whose translations from the Chinese I have obtained the ground work of this article.

It is understood that an order has been placed with Messrs. Krupp both for field and mountain guns, but its amount is at present uncertain.

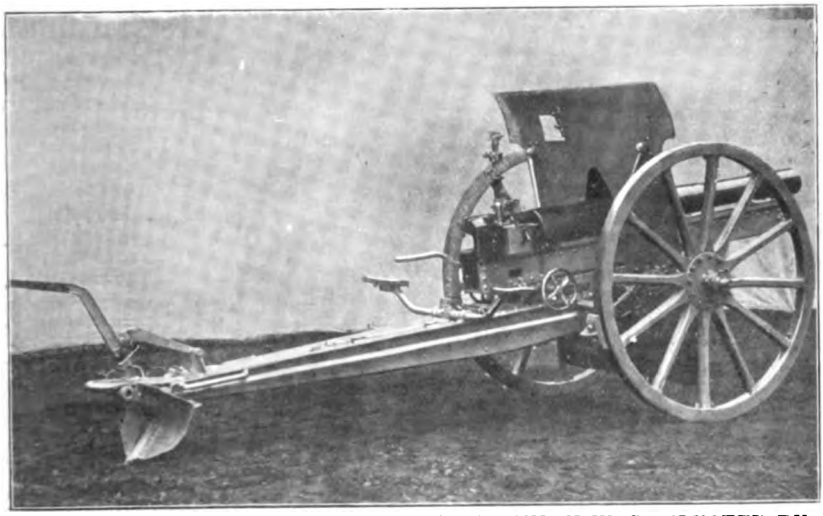

PLATE I.—THE 28 CALIBRE KRUPP GUN WHICH WAS SELECTED BY THE CHINESE GOVERNMENT.

The guns submitted for trial to the Chinese Government by Messrs. Krupp and Schneider were one each of 28, 29, 30, and 31 calibre field guns, and 75 and 70 m.m. mountain guns, respectively.

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The 28 calibre Krupp gun was that finally accepted by the Chinese Government, and I have, therefore, given the details of only the 28 calibre Krupp and Schneider guns.

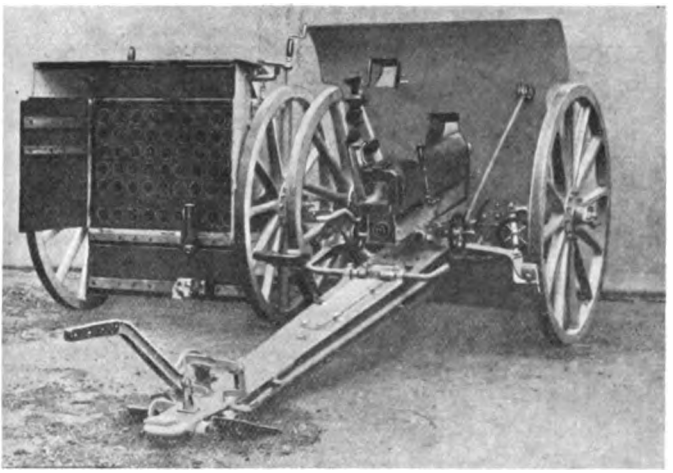

PLATE II.
THE 28 CALIBRE KRUPP GUN, VIEW IN ACTION WITH WAGON.

The objections of the Chinese Government to the Vickers Maxim gun described in the January article were:—

1. The screw breech not so perfect as the Krupp sliding block. It is more complicated, consists of more parts, and the single pieces cannot be changed quite so easily as in the Krupp block. It is known by experience that on the rough roads and in the dust which prevail in China, the screw breech is more exposed to defects and to wear and tear than the sliding block. Owing to its plane surfaces and its simplicity in construction the sliding block is more reliable than the screw block.

2. The firing gear too complicated.

3. Open or exposed springs are disadvantageous.

4. Although the spades buried themselves very deeply, the guns were not stable. They jumped, and this caused some bad results in the quick firing tests.

5. The barrel of the field gun too short. It should be at least 28 calibres long with muzzle velocity 500 metre seconds, whilst the weight of the shell should be 6 k.g. or more.

At short ranges the Vickers Maxim gun fired as well as a longer gun, but at long ranges there would be a decrease of accuracy.

6. The ammunition wagon of the field gun is of the old pattern, such as was used a number of years ago. Single packing of the ammunition is preferred because it makes the handling of the ammunition more convenient.

The baskets on the ground occupied valuable space behind the gun.

The ammunition wagon cannot advantageously be put near the gun for convenience in loading and at the same time form a protection for the gun crew, as it opens both front and rear and only half the

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ammunition can be extracted from either side. No fuze setting machine attached to the ammunition wagon. No arrangements for adapting the ammunition wagon so that it can be used as a protected observation post.

7. The mountain gun saddles unfitted for Chinese ponies.

Of these objections, No. 5 appears the only one that is inherently unreasonable.

It is understood that the Chinese Government did not originally ask for a gun of minimum 28 calibre long, 500 m./s. M.V., and 6 kilos weight of shell, and with regard to the last two stipulations, the fractional amount which the Vickers Maxim gun is short could hardly be considered a serious objection.

Details of Light Field Guns.

	Krupp 28 Calibre, 7·5 c.m.	Vickers Maxim 25 Calibre, 7·5 c.m.	Schneider 28 Calibre, 7·5 c.m.
Weight of gun with breech mechanism	lbs. kls. 728 331	lbs. kls. 501 228	lbs. kls. 611 278
Weight of gun with carriage and shield complete	1980 900	1620† 736†	1820 832
Weight of gun and filled limber behind the team	3157 1435 (24 shell in limber)	3185 1448 (51 shell in cart)	3062 1392 (34 shell in limber)
Weight of loaded ammunition wagon limber	2873 1306 (75 shell in all; 51 in wagon & 21 in wagon limber)	not designed	2954 1343 (92 shell in all, 58 in wagon and 34 in limber)
Muzzle velocity	f.s. m.s. 1660 510	f.s. m.s. 1620 488	f.s. m.s. 1640 500
Calibre of bore	ins. c.m. 3 7·5	ins. c.m. 3 7·5	in. c.m. 3 7·5
Type of breech mechanism	Krupp sliding block	interrupted screw, similar to 18-pr. Q.F.	eccentric screw single motion breech block
Maximum elevation obtainable on level ground	+16°	+16°	+16°
Maximum depression obtainable on level ground	−10°	−6°	−5°
Range at maximum elevation (16°)*	yds. metres 6610 5950	yds. mts. 6060 5450	yds. mts. 6000 5400
The time fuze burns up to	8100 7200	6700 6600	not given
Fine traverse of cradle right and left of centre line	3½°	3°	3½°
Weight of shield	lbs. kls. 100 45	not given	lbs. kls. 147 67
Thickness of the shield	·12 in. 3 m.m. (Sufficient to stop rifle and shrapnel bullets at short ranges)	not given	not given.—(by weight and appearance in photo to apparently at least as strong as Krupp's)
Ammunition	shrapnel and H.E.	shrapnel, common, and ring shell. (I only saw shrapnel).	shrapnel and H.E. shell
Weight of shell complete with fuze—(in both types	lbs. kls. 13·2 6	lbs. kls. 12½ 5·68	not given
Number of bullets in shrapnel	330	218	257
Type of powder	Krupp confidential	not given	not given—(weight of charge 475 kilos)
Weight of complete round, *i.e.* shell, fuze, cartridge, cartridge case, and primer	lbs. kls. 16 52 7·51	lbs. kls. 15·44 7·02	lbs. kls. 15·4 7
The wagon	plated with bullet-proof steel; carries 75 shell out of which 21 are in wagon limber	the "Am. cart" sent out with the gun is presumably intended as a limber and is not plated although both front and rear gun doors are stated to be of bullet-proof steel	No. of shell 92 (21 in wagon limber). Ordinary arrangements as in Krupp gun.
Thickness of plating	ins. m.m. ·16 & ·12 4 & 3	not given	not given
Packing of shell	by single rounds	shell packed in 17 wicker baskets 3 in a basket, 27 rounds being carried in front and 24 in rear of the "Cart."	by single rounds.

* Greater elevations can, of course, be obtained by sinking the trail.

† There is a doubt about these weights; they are shown in another place as being each 100 kilos (220 lbs.) heavier.

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Comparative Notes:—

There are nine wagons in a Krupp six gun battery as ordered by the Chinese. That is, the total amount of ammunition taken into the field with a six gun battery will be $9 \times 75 + 6 \times 24 = 819$ rounds, or 136·5 rounds per gun. Considering that it is calculated that an aimed rate of fire under favourable circumstances of 20 rounds a minute can easily be kept up, and 24 rounds—unaimed—were recently fired in one minute at the gun trials, this does not appear to be, to say the least, too much.

Power and weight.—As can be seen by the previous comparative table, Messrs. Vickers Maxim's gun is a lighter weapon than Krupp's, and suffers accordingly in a lack of power.

Number of rounds.—The total weight behind the team is approximately the same in each case, but that is because the Vickers Maxim "Ammunition Cart" carries 51 rounds to the Krupp limber's 24.

Mobility.—The power of dividing gun and limber into two separate vehicles—vide my previous article—must make the Maxim gun very much more mobile that the Krupp in ordinary Chinese country.

Battery details.—Messrs. Vickers Maxim have not, however, worked out the ammunition supply details of battery organization. The question of wagons and wagon limbers is entirely ignored, and the so-called "Ammunition Cart," which is really a heavy and indifferently built limber, is the only means provided or suggested for the conveyance of ammunition. This failure to work out details appears

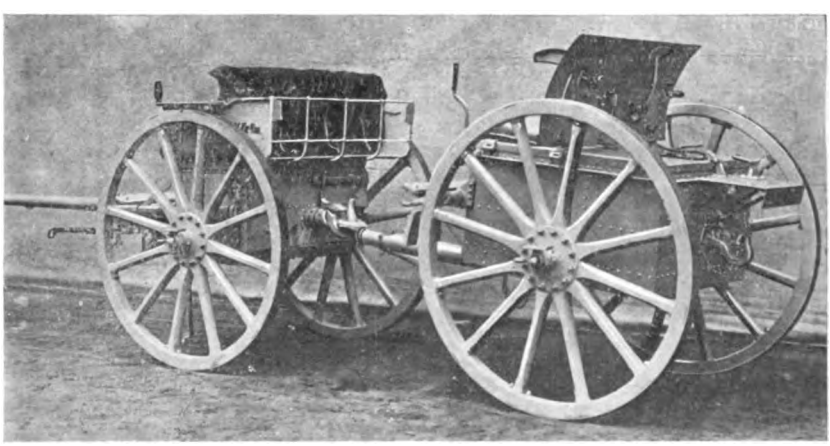

PLATE III.—WAGON AND WAGON LIMBER FOR 28 CALIBRE KRUPP GUN.

an error from, anyhow, a selling point of view on Messrs Vickers Maxim's part.

China apparently wants to buy six-gun batteries, and has no intention—as far as one can see—of buying guns only and building her own limbers, wagons, and wagon limbers, for them. Krupp had

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every detail worked out down to the weight of the spare parts, men's kits, and battery details, such as observation shields for B.C., fuze setting machines, &c., and thus gained a great advantage.

Cover for detachment (Vide plate 2).—When in action, gun, shield, and wagon of the Krupp gun gave complete cover to the detachment. The same cannot be said for Messrs. Vickers Maxim's equipment.

The Spade (Vide plates 1 & 2).—Both Messrs. Krupp and Schneider employ two kinds of spade for ensuring stability, a small spikey one for use on hard and stony ground, and a broad one with a wide flange and a large bearing surface, for use in soft soils. This broad spade was sufficient to stop the trail sinking, even on the soft sandy soil at the trial grounds, and this accounts for the stability of the mounting during the Q.F. tests. The Vickers Maxim spade, on the other hand, is unsuitably built for the sandy platform met with at the trial grounds, and insufficiently curved and faced for obtaining the best results.

It is very probable that the Vickers Maxim gun and mounting were as good as could be made for the weight, and the indifferent results obtained in the aimed Q.F. series were due, not to " jump," but to a continued sinking of the trail owing to the insufficient grip of the spade, which rendered it necessary to re-lay after each round.

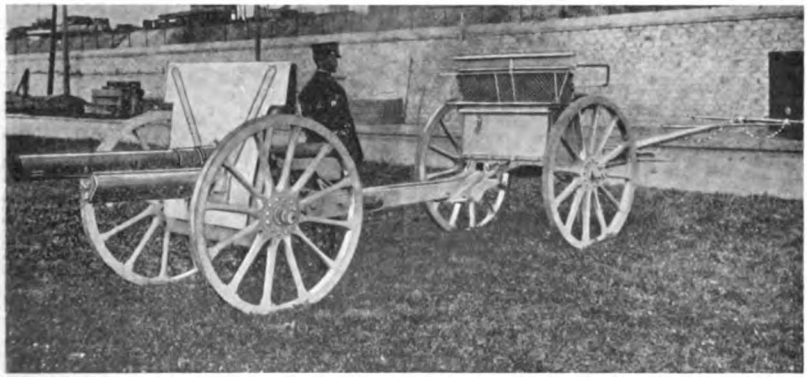

PLATE IV.—THE 29 CALIBRE SCHNEIDER GUN LIMBERED UP.

It will be noted, with reference to the comparative table of the Schneider 28 calibre gun, that in this case power has been sacrificed to an increase in the number of rounds carried in the limber. The weight of the wagon and wagon limber is 80 kilos greater than that of Krupp, this being due to the carriage of 92 rounds instead of 75, although each round is half a kilo lighter. Although no spectators were allowed at the Krupp and Schneider trials, which took place

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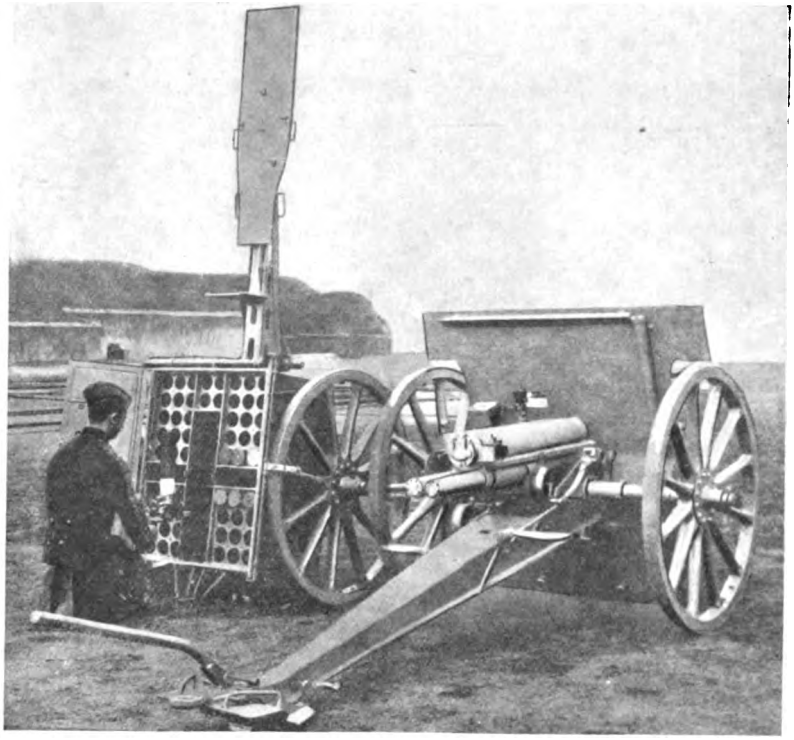

PLATE V.—THE 28 CALIBRE SCHNEIDER GUN IN ACTION.

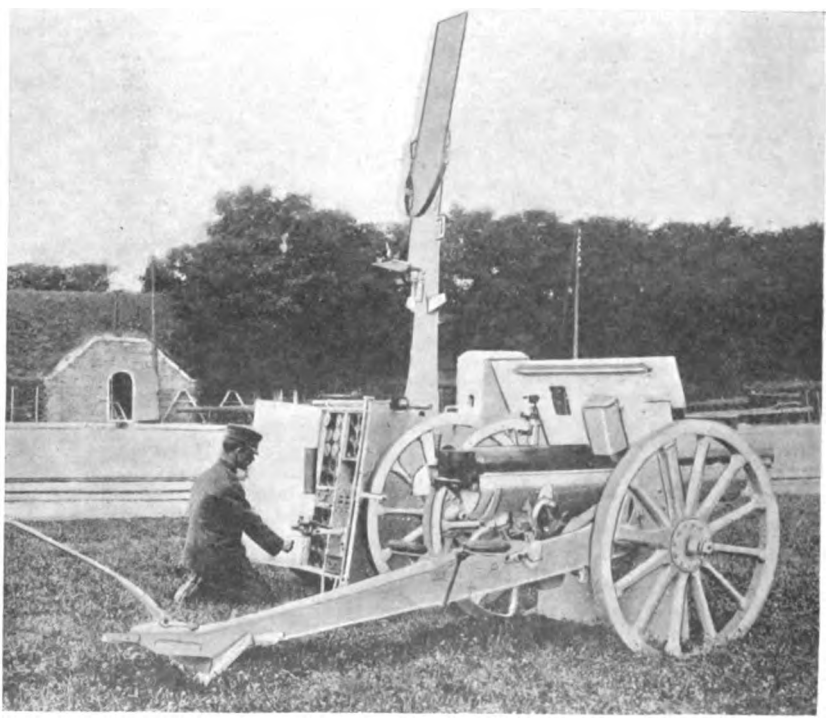

PLATE VI.—THE 30 CALIBRE SCHNEIDER GUN IN ACTION.
Showing B.C's Observation Post.

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together about a year ago, it is understood that this Schneider gun did particularly well, and was both extremely rapid firing and perfectly stable, as it was claimed to be. A particular point was made of the possession of the two spades, a fixed spade for firing on hard ground, and a moveable one for lighter soils.

Speaking generally, the advantages of mobility are so enormous in China, that a light gun of the type designed by Messrs. Vickers Maxim, with a separable gun and limber—a point of supreme importance—would probably be found more valuable in the end than the more powerful and less mobile weapon now selected by the Chinese.

THE MOUNTAIN GUNS.

ARRANGED AS FOR FIELD GUNS.

	Krupp Mountain Gun 14 Calibre, 75 m m.	Vickers Maxim Gun. 12½-pr. 75 m.m.	Schneider Mountain Gun. 14 Cal. 70 m.m.
Weight of gun with breech mechanism	lbs. kls. 238 108	lbs kls. 282 128	lbs. kls. 240 109
Weight of gun in firing position (*i.e.* with carriage and shield complete)	1100 500	1113 506	1113 506
No. of shell on one ammunition mule	12	12	16
Muzzle velocity	f.s. m.m. 1000 300 in m m.	f.s. m.m. 1150 350 in. m.m.	f.s. m.s. 1000 300 in. m.m.
Calibre of the bore	3 75	3 75	2·8 70
Type of breech mechanism	sliding block with semi automatic action	as for field gun	as for field gun
Maximum elevation (on level ground)	+24°	+25°	+18·45° +30° ••
Maximum depression	−8°	−10°	−12° +0 ••
Range at maximum elevation	metres 4750	metres 5500	metres 5100
Time fuze burns up to	4500	5200	4000
Fine traverse of cradle right and left of centre line	2° (nearly)	3°	2½°
Weight of the shield	lbs. kls. 158* 72	lbs. kls. 44‡ 20	lbs. kls. 160 73·4
Thickness of the shield	3 m.m.	not given	not given
Ammunition of two types as in field gun (Messrs Vickers Mazim only produced shrapnel as far as I saw).			
Weight of shell complete with fuze (in both types)	lbs. kls. 11·7 5·3	lbs. kls. 12½ 5·7	not given
Number of bullets in shrapnel shell	225†	218§	280††
Type of powder	D.F.P.	not given	not given
Weight of complete round (*i.e.* shell, cartridge, cartridge case and primer)	not given, about— lbs. kls. 13·73 6·24	lbs. kls. 14·8 6·8	lbs. kls. 12·8 5·81

NOTE.—Seven mules required in "First Line" in Vickers Maxim and Krupp equipment and six in Schneider equipment, including only one ammunition mule.

A plate and description of the Schneider m. gun will be found in Vol. XXXVI., No. 3, page 102, R.A.I. Journal.

* Size of shield about 4′ 6″ square with extending side pieces at the bottom.

† One ball weighs ·011 of a kilo.

‡ Size of shield about 3′ × 2′.

§ 41 to the pound.

•• This gun possesses a cranked axletree, and the two readings given are the two maximums and minimums in the low and high positions respectively.

†† There is also an ammunition shield weighing 41 kilos.

‡‡ One ball weighs ·01 of a kilo.

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WEIGHTS OF LOADS.

	Krupp.		Vickers Maxim.		Schneider.	
	lbs.	kls.	lbs.	kls.	lbs.	kls.
Gun load (plus shield and minus breech in Vickers Maxim equipment)	295	134	272	124	303	138†
Cradle and buffer, &c.	277	126	273	124	307	140‡
Trail—front portion, &c.	268	122	251	114	312	142§
Trail - rear portio , &c. (plus breech ring in Vickers Maxim equipment)	253	115	218	99	Nil.	
Wheel and axle load	275	125	259	117	339	154**
Shield (in Krupp equipment), recoil springs, &c. (in Vickers Maxim)	225	98	212	96	312	142††
Ammunition load	260	118*	246	112	298	135‡‡

NOTE.—The increase of weight in saddlery is probably weight saved in the long run. For detail of Vickers Maxim's loads see my previous article; I have not seen Messrs. Krupp or Schneider's loads nor been able to obtain any detailed information. The weight of the Krupp saddlery is in all the first six loads 57 lbs. and in the ammunition 46 lbs. Messrs. Vickers Maxim's average about 40 lbs., and Schneider from 54 to 68 lbs. in weight.

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* Nothing stated as to conveyance of fuze setting machine or if one is used in mountain equipment.

† Gun and breech fittings with muzzle and breech.

‡ Cradle and sledge complete with shaft.

§ Carriage and axletree.

** Wheels, near end of trail, traversing handspike, and two transporting levers.

†† Gun and ammunition shields.

‡‡ Two boxes containing 16 rounds of ammunition; the first ammunition mule has also to carry the fuze setting machine and its support, weighing 16 kilos.

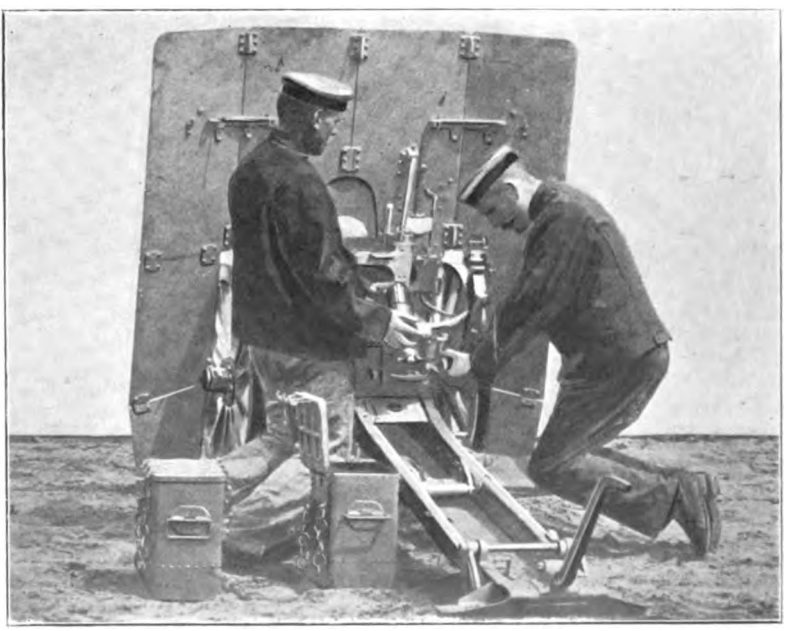

PLATE VII.—THE KRUPP MOUNTAIN GUN IN ACTION.

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General comparative remarks on the three mountain guns:—

There is no doubt that from a statistical point of view the Vickers Maxim gun is the superior weapon. The gun is heavier (20 kilos) by itself, and the piece heavier by 58 kilos (excluding the shield) in the firing position. Against that, however, can be set a heavier shell, increased muzzle velocity, range, range with time shrapnel, and in fact generally greater power, which more than makes up for the difference. Equally favourable is the comparison of the weights of the loads when limbered up, but it must be remembered that this is, to a large extent, illusive, for the following two reasons:—

1. That the Krupp shield is a large and valuable one giving real cover, while the Vickers Maxim one is too small to be of much real use. This accounts for a difference of 52 kilos in the total weights of the loads.

2. That Messrs. Vickers Maxim have saved weight on their saddlery in a manner which is likely to affect the stability of the loads.

Messrs. Vickers Maxim's gun, quâ mountain gun, suffers from the following very serious defects:—

1. Too much delicate mechanism liable to get damaged by the wear and tear of hill work and not capable of being easily replaced.

2. No alternative sights for direct laying if panoramic sight is casualtied.

3. A shield not large enough to be of much use as cover, but heavy enough to be an inconvenience in transport.

I have not seen either the Krupp or Schneider guns, and so cannot speak definitely of them, but I hear from eye witnesses that they are much more simple weapons, possessing no panoramic sight, but having (vide the photos) large shields which give considerable protection to the detachments, if not complete cover.

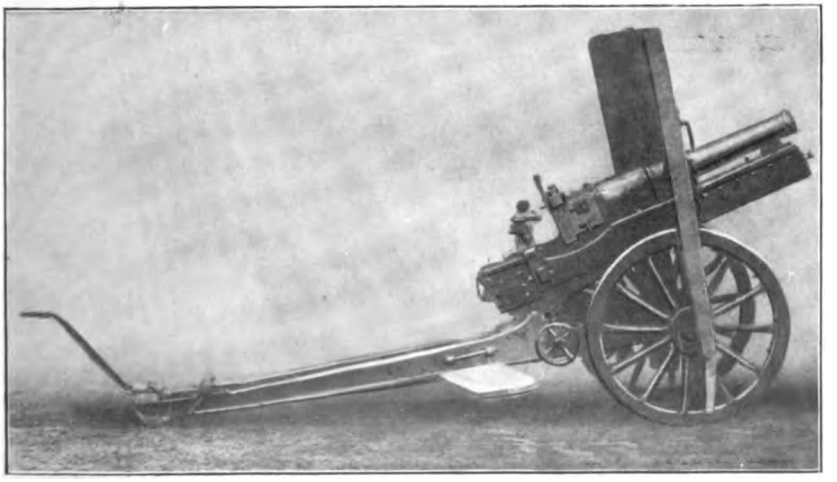

PLATE VIII.—THE KRUPP MOUNTAIN GUN, SELECTED BY THE CHINESE GOVERNMENT.

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They are undoubtedly much less powerful weapons than the Vickers Maxim gun. I have no knowledge of the time necessary to unlimber and limber up, or of the behaviour of the loads when limbered up.

With regard to the Vickers Maxim loads, the saddles were unsuitable and the travelling results obtained not good. The ammunition boxes were too light for their work, and not at all fitted for rough wear and tear. Where in India leather and iron are found scarcely strong enough, it is hardly likely that wicker will succeed in China.

With regard to Messrs. Schneider's gun, the ballistics compare unfavourably both with Krupp and Vickers Maxim, while the weights are approximately the same as in the Krupp equipment. The cranked axletree is a complication, and it seems doubtful whether the advantages compensate for the lack of simplicity.

Messrs. Schneider make a point of having elaborated their saddles and equipment with the assistance of the French mountain artillery. They have certainly saved a mule, but their loads are so heavy that it is doubtful whether sufficiently powerful mules could be found to carry them in the hills, especially the first three, which must be top loads.

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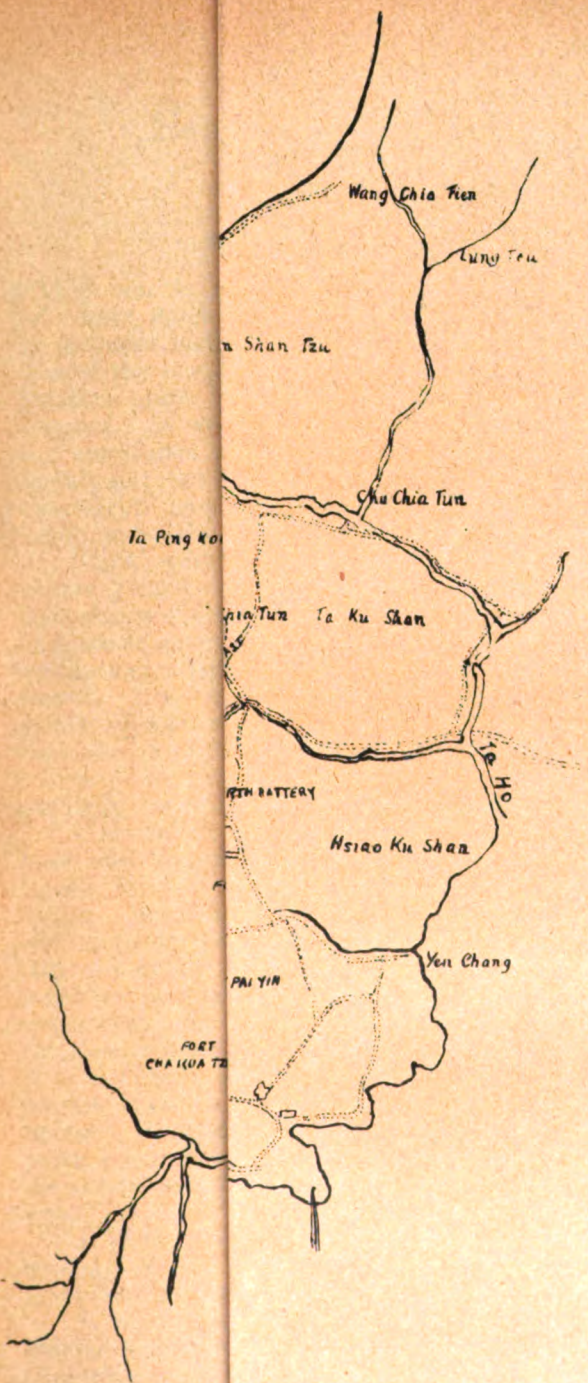

route followed.

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Japanese searchlights.

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Searchlights in the Field.

By "ARTILLERYMAN."

OUR war in South Africa, and later the struggle in Manchuria, have emphasized to an almost startling extent, the necessity for frequent tactical night operations, in order to minimise loss, and to save the troops from the nerve racking strain of advancing long distances under the intense fire, which can be developed by modern weapons. In wars of the future, the presence of numerous airships and aeroplanes will, no doubt, necessitate extensive strategic night operations; but this is perhaps outside the limit of our subject, as searchlights would hardly be used by the terrestrial, though they might be by the aerial army.

Night operations, as practical experience has constantly proved, require greater care in arranging, and greater resolution in execution, than almost any other minor tactical operation; yet, even when every imaginable precaution has been taken, and the most careful staff arrangements made, their success or failure may rest on the veriest chance. It is true that chance or luck must ever play an important part in all tactical operations, whether by day or night; but the part they play in night operations is often preponderating; and it is with a view of in some measure counteracting this, that serious attempts are being made to adapt searchlights to work in the field.

Unfortunately, whilst emphasizing the necessity for night operations, and bringing most prominently into notice their inherent difficulties, the two latest wars have offered no solutions of these difficulties. Searchlights were used to some extent in the Russo-Japanese war, and reference will be made later to several occasions on which they apparently had some effect on the operations. On the whole, however, judging from the accounts at present available, sufficient experience was not gained to establish any general principles for their employment, nor to settle conclusively whether their assistance is of sufficient importance to justify the large outlay necessary to provide them in sufficient numbers to be of general use. We are reduced, therefore, to basing our conclusions to a large extent on peace practice—a method at once unsatisfactory and misleading—as the conditions of war and peace are in most respects as the "poles apart."

It is proposed to first briefly consider the use of searchlights as existing at our defended ports, so far as the conditions refer to operations in the field.

It would appear to be a matter of little difficulty to choose suitable sites for five or six searchlights, half a dozen Q.F. guns, and an observing station, for the defence of a restricted water-area. Experi-

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ence shows, however, that it is a most difficult matter even when we know the direction from which the attack must be delivered. Firstly, the sites for the guns must be selected, so that they command every part of the water-area at decisive ranges, and are not unduly exposed to hostile fire. Secondly, the searchlights must be sited in such a manner, that no part of the water-area is "dead," *i. e.*, unsearched by one or other of the lights, that an approaching boat can be "picked up" at a range of 2000 to 3000 yards, followed to close range, and illuminated so as to form an easy target for the guns. Thirdly, observing stations must be chosen, from which a good view can be obtained over the whole area.

The siting of the guns is perhaps the easiest part of the work. Their arcs of fire can be plotted on the chart. The best method of grouping them in batteries and the safe minimum interval between them is known. Therefore, little is left to be done except actual construction work. In the matter of siting the E.L's, however, we have very little reliable data to guide us and the actual sites must be determined largely by experiment. Standing close to the projector of an E.L. it is most difficult to "observe"; moving to a flank, observation becomes easier, but the beam of light seems to form an opaque screen shielding objects on the further side. As the "light" is traversed away from the observer, observation apparently becomes easier, as it moves towards him, more difficult. When the beam of light is directly across the front, it is practically impossible to "observe." From a position about fifty feet or more, immediately above the lights observation is easy in all directions. This is, therefore, the most favourable position both for guns and observing stations, but is not often attainable.

In a slight mist or rain the range of the lights is seriously decreased, in a slight snow storm their extreme range hardly exceeds 400 to 500 yards, whilst in a fog they are useless. This sensitiveness to the condition of the atmosphere is the more serious as it is extremely hard for an observer to decide to what extent the range is being obscured. The lights, if anything, appear to be burning brighter, probably owing to the small particles of moisture or snow acting as mirrors, diffusing the light, and thus increasing its dazzling effect. But whatever may be the cause, it is hardly necessary to point out what a dangerous condition of false security might be induced, either on land or at sea, were this peculiarity overlooked by an untrained observer, or not sufficiently understood by the officer in charge.

Closely allied to this difficulty of observation in thick weather is the question of the uncertainty of searchlights, and their dazzling, or more properly speaking, distorting effect.

Even when installed in fortresses, in stationary emplacements, with the best types of engines, and where everything can be arranged to increase the power and efficiency of the "beam," searchlights frequently flicker and burn badly. For work in the field then, where so much will have to be sacrificed for mobility, they will be still less dependable.

The dazzling, or distorting effect, is referred to again later, for the present it will suffice to mention one or two instances to illustrate this effect both on the attacker and defender.

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Some years ago, during combined manœuvres, a naval officer claimed to have put out a searchlight by bombarding it from a range of 3500 yards. It subsequently transpired that the range was over 8000 yards. The writer was with a torpedo flotilla on one occasion, proceeding towards a defended port, well lighted by searchlights. At a distance of between 6000 and 7000 yards, ordinary small print could be deciphered on deck, and every detail of the accompanying boats could be seen up to a distance of about 300 yards. The lights looked quite close, and if our position had not been known accurately, we should have estimated the range at between 3000 and 3500 yards. Several of the bluejackets remarked that we must be visible from the shore, yet we were not, nor were we "picked up" until we had approached to within 2000 yards of the shore look-out stations. Even when close to the lights this difficulty does not seem to appreciably diminish. In a report in an American journal, it was stated that a searchlight, raised fifty feet from the ground, was found to be quite uninjured, after it had been fired at for some time by a company of infantry at unknown ranges varying from 800 to 1200 yards, owing to their being no visible adjacent object from which the range could be approximately estimated.

From the defender's point of view the effect is perhaps more distorting than dazzling. At naval manœuvres a few years ago a battle squadron reported, that one night they had been attacked by a cruiser squadron using searchlights. It was proved later that the cruiser squadron referred to was many miles away at the time; but that the battle squadron had been attacked by a flotilla of destroyers and torpedo-boats. Perhaps more convincing is the recent notorious Dogger Bank incident, when the Russian fleet mistook fishing trawlers for hostile torpedo-boats, and opened fire on them at short range.

It must be remembered that this dazzling or distorting effect occurred over sea ranges in open water, where there were no neighbouring objects, from which to judge the relative size of the targets, and that possibly there would not be the same difficulty over land ranges. But, on the other hand, unless the ground had been thoroughly reconnoitred, the same difficulties might be experienced owing to the changed appearance of familiar objects.

The tactics of the lights are simple. The advanced beams "pick up" the approaching hostile boats at ranges varying from 1800 to 2300 yards, in the case of small craft such as torpedo-boats and at ranges of between 3000 and 4000 in the case of large boats. The gun detachments are warned, and as the target becomes fully illuminated by the nearer lights, in what is generally known as the illuminated area, the guns open fire. Twelve hundred yards may be taken as the average range generally, at which an effective fire could be opened on small craft, even with the telescopic sight.

To briefly summarize, we learn from the use of searchlights at defended ports:—

That it is difficult, without actual experiment, to site searchlights so as to efficiently light up a given area and yet not interfere with the view of the defenders.

That the efficiency of searchlights is largely dependent on atmospheric conditions.

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That specially trained observers are necessary in addition to the technically trained detachments.

That searchlights, owing to the difficulty of estimating the range, are not easy to damage by fire.

SEARCHLIGHTS OVER LAND RANGES.

In addition to the advantages and disadvantages of searchlights, which have already been touched on, there are a few others, which is is proposed to briefly discuss, and which perhaps have a more direct bearing on the use of the lights in the field.

Electric searchlights are the most powerful, providing the weather conditions are suitable, and at the same time the most adaptable light known. They can be instantaneously "doused" or "opened," and can be traversed in any direction. Thus introducing the element of surprise. Their range, if concentrated beams are used, extends as far as 2000 to 3000 yards for observation purposes, and considerably further if it is merely required to illuminate the ground. For fighting purposes they can be used as dispersed beams to illuminate the immediate foreground to a distance of about 1000 yards. In hilly country or in country where movement was restricted to certain well defined areas, they could be used to keep an area under observation, or to illuminate high ground which had to be attacked, or which would act as a guiding mark during a night advance. Their effect when suddenly flashed on individuals is most disconcerting, and if intermittently flashed (by means of a shutter), their effect is so blinding as to check the forward movement of troops and to almost prevent men using their rifles effectively. Their disadvantages appear, generally speaking, more pronounced to the inexperienced than to the expert. In a flat close country only the immediate foreground can be illuminated, the thinnest hedge acts as an impenetrable screen; naturally conspicuous or light objects appear nearer than they really are; dark green ones appear to be further away. Owing to the length of the shadows, many objects have a distorted appearance, increasing the difficulty of observation.

Moving objects can be identified as a rule with ease; stationary ones are most difficult to pick up, even at medium ranges. A body of troops halted in open formation, would possibly not be seen at a range of 1700 yards. If lying down they would probably pass unnoticed at 600 to 700 yards, providing no glitter of their accoutrements drew the special attention of the observing officer. It is not easy to accurately direct a light so as to illuminate a particular restricted area, without lighting up the adjoining terrain. This is partly due to diffused light and partly to reflection. Thus, supposing a beam to be directed from a flank on to an entanglement some 50 to 100 yards in front of a line of trenches, it would be most difficult to avoid showing up the trenches. This also applies in a marked degree when concentrated beams are used to search distant positions. The terrain—though not under observation beyond 3000 yards—would be sufficiently well lighted to greatly facilitate the movements of troops up to probably 6000 to 7000 yards. Light grey blue uniforms are said to be almost invisible on a green background.

The opacity of the beam from a flank has been mentioned. This

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would constitute a serious danger if the lights were handled carelessly. A beam thrown obliquely across the front of a trench would enable the enemy to approach it unseen whilst lulling the defenders into a state of false security. Hostile lights can be used in neutralising the effect of an opponent, either by being turned directly on to the projector, or thrown across the other beam. The stronger beam has the advantage.

The effect of a slight screen has been referred to. Some years ago, during manœuvres in the south of England, a night attack by two battalions of territorials was carried out against a fort, on which were mounted two searchlights, the larger being a 75 cm. light. A light wattle fence ran diagonally across the front of the fort, at a distance of from 100 to 400 yards. To approach the side of the fort, which it had been decided to assault, the troops had to advance along the fence. Instructions had been given that the men were to lie down when the searchlight was turned on them, but progress was so slow under these conditions, that the men were told to advance steadily, crouching behind the fence. The whole of the two battalions crossed the front of the fort in this manner, in the full glare of the light, unseen by the defence. It must be added that the attackers had a searchlight directed on to the fort, but the defenders stated that they were in no way inconvenienced by the hostile light.

The mechanical working of all searchlights in the field is practically similar, except perhaps the very small ones, which would generally be worked entirely by hand. It will, therefore, only be necessary to describe the 90 cm. light, which is one of the largest, and consequently, one of the most important now used on a mobile carriage.

When the projector is worked by hand by an assistant, the observer is connected with him by telephone, or speaking tube, and gives instructions direct, as to traversing, elevating, &c. This is not altogether a satisfactory method, unless the assistant and observer are accustomed to working together, but the difficulties are to some extent obviated by the use of two oriented dials, one fixed on the projector, the other in the observing station. The chief advantage of this method is that the light can be suddenly switched on to any particular point, in the hope of surprising advancing troops before they can take cover. The effect can be increased by means of a shutter. The shutter being suddenly opened when the light is pointing in the required direction. Should the distance between the observer and his assistant be too great for telephonic communication, it has been suggested that lamp signalling could be used. The difficulty, however, of reading a lamp placed anywhere near the beam of a searchlight is so great, that this form of communication should only be tried when all others have failed.

If a traversing motor is used with the projector, the observer can direct the light "at will" on to any particular area which he wishes to search, and elevate or depress until it is at the best angle for observation purposes. The disadvantages are, that the light can only be traversed slowly and at a uniform rate, and it is said to be very tiring to the observer. By having reliefs of trained observers the second disadvantage could be remedied, though it might be found

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difficult to keep up a supply of trained observers during a campaign. The first, however, is more serious as it sacrifices the advantage of being able to suddenly switch the light into any required direction, and surprise troops in motion.

Of the two methods, it will probably be found that the one involving the use of the traversing motor is unsuitable for field work. It is more complicated, and seems to possess no compensating advantage.

So far, searchlights have been dealt with generally, their further consideration falls into two main headings:—

A. Siege operations (considered briefly in reference to Port Arthur).

B. Field operations.

A. SIEGE OPERATIONS (considered briefly in reference to Port Arthur).

Sieges, it is reasonable to suppose, would offer more opportunities for the use of searchlights than any other operations of war. It is, therefore, disappointing to find that at the siege of Port Arthur so few attempts seem to have been made to utilise them, though at the time of the close investment—the 16th August, 1904—fifteen Russian searchlights were mounted on the land front, in addition to eight on the sea front. Of this number, only two were situated in the "front of attack," viz., at the Sung-shu supporting battery, and at the work some 1200 yards to the south-east of it. It is true that one attempt was made to supplement these two lights by establishing a third in Fort Sung-shu itself, but the attempt was not very successful, as the light was almost immediately destroyed by hostile artillery fire. Many of the other lights on the land front were sited close to works of defence, and being insufficiently protected by bomb proofs, were wrecked by fire not specially directed at them. There was no organised system under which the lights were worked, and it is said, they were often as much assistance to the Japanese as to the Russians. An exception to this occurred during the attack on the Sung-shu supporting battery on the 26th November, which will be referred to later.

The Japanese had two powerful lights mounted, one north-west of Tuan-shan-tzu, the other near the observation station of the naval brigade. The nearest, near Tuan-shan-tzu, was about 2700 yards from the Russian line of forts, the other was some 2000 yards further away. Both projectors were mounted on trucks so that they could, at any time, be run under cover. The generating plant was under cover and well protected by bombproofs. After the failure of the first general assault both lights were concentrated near Taun-shan-tzu. In this position their height was about 425 ft. above sea level. The line of Russian works was on a ridge immediately opposite at an average height of about 300 ft. and at a range of 2700 to 3000 yards. The Japanese infantry were advancing against the Russian works up slopes varying from 1 in 10 to about 1 in 4½. It would appear to have been almost an ideal situation for searchlights. Yet they were apparently never effectively used, and were sent northwards in

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November to the field army. They were constantly fired at by the Russians, but were never hit.

The preliminary operations of the Japanese consisted in the attack of the outlying works of Taku-shan, Hsiao-ku-shan, the waterworks redoubt, 174 metre hill, head-quarter hill and Kan-ta-shan. The procedure in each case was similar. A heavy bombardment commencing at dawn, and increasing in intensity until the moment of assault.

At Taku-shan and Hsiao-ku-shan the infantry advance commenced at 7.30 p.m. Owing to darkness and heavy rain, as well as the difficulty experienced in crossing a stream called the Taho, the attackers only succeeded in establishing themselves at the foot of both hills. The advance was continued next day, in daylight. Taku shan was captured at 8 a.m. and Hsiao-ku-shan some hours later. The Russians made a counter-attack during daylight, but failed to re-take either hill. The infantry advanced against head quarter hill at 9 p.m. on the 13th August, in the darkness the head of the column lost its way and seized the knoll at the northern end of the Hill. Discovering their mistake about midnight the men advanced against the main position, which they captured next day, after repeated assaults in daylight. 174 Metre Hill was attacked by two Kobi regiments on the night of the 19-20 August. The entanglements at the foot of the hill were cut, but the hill was not finally captured until just before dusk on the 21st, after a most stubborn struggle, which continued throughout the whole day. Kan-ta-shan was evacuated without a struggle on the 18th August. The Waterworks redoubt was attacked on the night of the 19th-20th August. The Japanese succeeded in establishing themselves on the glacis of the work, and cutting the entanglement, but were driven off at 2 p.m. next day by a determined counter-attack of the Russians.

In all these operations it is noteworthy that attacks by daylight were far more successful than night attacks. This may have been due to faulty arrangements on the part of the Japanese, and to their being over confident of success; but it was more likely due to the difficulty of keeping touch, and to the uncertainty of the exact position of the defender's trenches.

The first general assault on the "front of attack" (the north-eastern front) was made between the 19th and 24th August. The accounts of the fighting are very confused. The line occupied by the Japanese was only 600 to 1000 yards distant from the line of Russian permanent works, but the intervening ground was so intersected and cut up by numerous ravines and watercourses, that the units of the attack became inextricably mixed and hopelessly confused. Two events stand out very clearly. The captures of the west Pan-lung redoubt at 5 p.m. on the 22nd by rather more than two companies of infantry, whose attack took the defenders somewhat by surprise, and a desperate night attack on the Wangtai redoubt. The Russians made several counter-attacks at night against the West Pan-lung redoubt, but were unsuccessful.

It was during the night of the 23rd-24th August, that the attempt was made to carry Wangtai by storm. The redoubt lies 500 to 600 yards from East and West Pan-lung, and is about 250 feet higher.

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The intervening ground is quite open. Company after company dashed up the slopes only to be hurled back in the most desperate confusion. Several parties appeared to have so completely lost their way as to have attacked one of the permanent forts, 200 feet below Wang-tai and some 600 yards from it. The Russians used streams of magnesium rockets and "flares" to light up the scene. The attack failed utterly. As showing the character of the fighting it is interesting to note that two battalions, which took part in the general assault, lost 1600 out of a strength of 1800.

Electric searchlights were not used by either side, or if used, their effect was so small as to have passed unnoticed. Yet, it would appear that there were two opportunities for the Japanese searchlight sited near Tuan-shan-tzu. The first, during the first two nights fighting, when the Japanese stormers were advancing up the ravines and watercourses for the assault on the Russian front line of works. The second, during the night assault on Wangtai. In the first case, the Russian forts were only 2700 yards from the light, and if one of them had been " lit up," it would surely have assisted the assaulting columns in maintaining their direction. In the second case, the stormers had to advance 500 to 600 yards up a slope, the upper part of which was about 1 in 4. The searchlight was roughly 3200 yards distant and some 125 feet lower than Wangtai, on the opposite side of the valley. The situation appears most favourable. As, however, the Japanese did not use their searchlight, we must conclude that they considered darkness, with all its attendant difficulties, preferable.

The magnesium rockets and flares used by the Russians must have proved most efficient, judging by the Japanese casualties, and the apparent ease with which the defenders withstood all the assaults.

The only advantage gained by the Japanese was the capture of the West Pan-lung redoubt in daylight. Even after this experience, though the siege lasted four and a half months, the Russians do not appear to have made any efforts to mount their searchlights to meet the night attacks, which they could not but realise, must follow the ill-success of those we have mentioned.

The second general assault on Port Arthur and the events leading up to it were similar in character to those we have described. Realising that they could not capture the works held by the Russians by direct assault, the Japanese commenced regular siege approaches. When their last parallel was within 150 yards of the Russian advanced trenches, an assault was ordered under cover of an intense bombardment, and it is a remarkable fact, that assaults in daylight were more frequently employed than at night, and were more uniformly successful.

The waterworks redoubt was captured by a night attack which commenced at 5.40 p.m., and was finally successful at 2 a.m.—eighty yards separated the rival trenches. The first assaulting party was 400 strong. Total Japanese loss, 500. On the 19th September, " B " redoubt was bombarded from 2 p.m. to 6 p.m. The trenches were within 80 yards. The first assault took place at 6 p.m. and was unsuccessful. There were numerous assaults throughout the night, but the redoubt was not captured until 9.40 a.m. on the 20th September. The Namaka Yao was similarly attacked at 6 p.m. on the 19th, but

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not captured until between 3 and 4 p.m. on the 20th. 203 Metre Hill was attacked in the evening of the 20th September, by three columns. The attack was unsuccessful, and the Japanese had 2500 casualties, principally from artillery fire. At 3 p.m. on the 9th October, two parties of Japanese fifty to eighty strong, rushed from their advanced trench in front of Fort Erh-lung and captured the Russian trench, distant about 80 yards. "G" redoubt was similarly captured at 4.55 p.m. The Russian trenches immediately in front of forts Erh-lung and Sung-shu were assaulted at 5 p.m. on the 26th October. And now all was ready for the second general assault.

Under cover of an intense bombardment, the second general assault was launched at about 1 p.m. on the 30th October. The distance separating the forces was nowhere more than 160 yards, and in most places much less. The fighting was of a most desperate character, only a few yards in many cases separating the combatants. At 3.30 p.m. it was seen that the assault had failed except that the three small provisional works "G," "P," and Kobu, remained in the Japanese hands. "P" was recaptured by the Russians at 10.30 p.m., but again assaulted and finally captured by the Japanese about 11 p.m. The Japanese stormers were headed by Major General Ichinohe. The Russians expected a renewal of the attack that night, firing magnesium rockets from Fort Chikuan wherever they detected movements in the Japanese lines.

Undaunted by their failures, the Japanese fixed the 26th November for another general assault. The same procedure was followed. A heavy bombardment commencing at dawn gradually increasing in intensity until about 12.50 p.m., when the various columns of stormers sprang forward to the assault.

The attack was a complete failure, and realising this the Japanese determined to attempt the capture of Sung-shu supporting battery (*vide* diagram) by an assault that night.

It was a desperate venture, and volunteers were called for from the whole army. The force numbered 2600 of all ranks, under command of Major General Nakamura. It had to traverse a distance of about two miles, and a start was made between 6 and 6.30 p.m., in order to get into position about 9 p.m., before the moon rose. After crossing a small bridge over the railway about 600 yards from the point of assault, the rear of the column took the wrong road, but finding out their error in time were able, with the help of the Russian searchlight, to rejoin the main column before the commencement of the assault. When the main column had arrived within about 500 yards of Sung-shu supporting battery, it was "picked up" by a Russian searchlight (probably from the neighbouring work of An-tzu-shan, distant about 1800 yards). The searchlight was waved up and down and then directed on to the Japanese, who apparently made no effort whatever at concealment, but advanced directly against the searchlight in Sung-shu supporting battery. A heavy fire was opened from all the Russian works, and reinforcements were hurried up. At first very few casualties occurred, but as the Japanese column advanced to the close assault, it came under a devastating fire. Charge after charge was made against the entanglements, but without result, and between 2 and 3 a.m., after a loss of over 1000 men, including General

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Nakamura, the shattered remnants of the column withdrew. During the withdrawal there were very few casualties. This ended the third general assault. The Japanese casualties reached a total of about 4000, the Russian's 500.

With the exception of the closing incident, the third general assault throws no further light on our subject. There are, however, several points in connection with the attack on the supporting battery which are of interest. The route followed by the Japanese is apparently within range of at least three of the Russian searchlights, yet the troops were not "picked up" until they had crossed the railway line and were within some 500 yards of their objective. The following description occurs in the official account, page 89, Part III. "Next "morning to an observer near Kan-ta-shan, the corpses showed as a "dark patch on the hill side." As Kan-ta-shan is over 4000 yards north-west of the point of assault, we are led to infer that the men were wearing their dark greatcoats. The assaulting column suffered surprisingly few casualties either advancing to the assault after they had been "picked up" by the lights, or falling back after failure, although they apparently made no efforts at concealment.

All this points to inefficiency of the lights, either through bad siting, want of organization, difficulty of observation, or unsuitability for this class of work. Want of organization and difficulty of observation would account for the small loss sustained by the column whilst advancing or returning, and for the delay in "picking up" the column; though if the men were in dark greatcoats, observation should have been easy; especially as no attempt was made at concealment. Of itself, the incident seems to offer insufficient grounds, on which to base principles regarding the general use of searchlights.

The closing scenes of the drama, enacted before Port Arthur, offer few other details bearing on our subject, except perhaps the close attack of the permanent works.

203 Metre Hill was assaulted and captured almost entirely in daylight, and searchlights played no part in the struggle.

During the close attack of the permanent forts, the Russians suffered from the disadvantage of being unable to illuminate the ditches. This might possibly have been effected by searchlights well entrenched, but when the assailants were within a few yards of each other it is difficult to believe that searchlights could be of much value, unless the terrain were suitable for directing the beams from a distance.

Before briefly summarizing the lessons of Port Arthur, it is interesting to note that the Japanese preferred to make their assaults in daylight, and were more successful by day than by night. This may have been due to their reckless disregard of life, which European nations could hardly afford to imitate, or to the difficulties they experienced in night assaults. Probably the explanation lies somewhere between the two theories. The Japanese infantry, brave and self-sacrificing though they were, showed some hesitation on one occasion, and possibly on others, in pressing home a night attack, and this may have influenced their leaders. It is certain that the defenders disliked night work, as it is a remarkable fact that many of the Russian troops preferred to carry out repairs in daylight, under a

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heavy bombardment, rather than at night, when they had a difficulty in seeing their work, but were only exposed to an occasional shell. It must also be remembered that the streams of magnesium rockets fired by the Russians appear to have been extraordinarily efficacious in lighting up the stormers. The advantages claimed for them are, that they give sufficient light to enable the defenders to aim accurately at short range, that they are disconcerting to the attack, and that they in no way light up the defenders or their trenches.

We learn from the Siege of Port Arthur:—

1. That to the attackers, searchlights are of little value, because in the earlier phases of a siege darkness is necessary for the construction of the parallels and approaches, and in the later phases, the combatants are in such close contact as to make it impossible to avoid lighting up friend and foe indiscriminately. Further, that assaults by daylight are both practicable and often successful.

2. That the defender may find opportunities for the use of searchlights, but they will be exceptional. If searchlights are used, they must be sited so as to be clear of shell fire not specially directed at them, (*i. e.* ,not placed inside or near works of defence liable to be bombarded), and the projectors, engines and dynamos, must be most strongly protected by bombproofs.

3. Lastly, that a most efficient substitute can apparently be found for searchlights in magnesium rockets and flares, and in connection with this it must be remembered, that the defence of Port Arthur was directed by a most able and energetic engineer officer, General Kondrachenki, who would have been most unlikely to fail in utilising the searchlight already mounted on the land front, and those which could have been obtained from the fleet, should there have been opportunities for their employment.

B. FIELD OPERATIONS.

Tactically speaking field operations may be divided into:—

1. The encounter battle.
2. The attack of an enemy in position.
3. The defence of a position.

1. The encounter battle:—

Is usually brought about by the unpremeditated meeting of the opposing forces. Each commander strives to deploy first and seize the initiative. As the encounter progresses, one of the opponents is usually forced into a defensive attitude, and he may decide either to retire to some more favourable position in rear, under cover of a strong rearguard, or to hold his ground and await reinforcements. His action is governed by the tactical requirements of the moment. In either case it is improbable that there will be either time, or opportunity, to make the careful arrangements necessary for the employment of searchlights. Should both forces bivouac on the ground in close touch, with the intention of renewing the attack at dawn, the conditions would resemble those of the close attack of a position and can be considered later.

In the case where a beaten force has to withdraw through a defile, under cover of darkness, there would appear to be an oppor-

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tunity for the attacker to utilise searchlights, but such opportunities will always be very rare. To find suitable sites for searchlights in country not previously reconnoitred, and in face of a rearguard, would be an almost impracticable undertaking, even if searchlights were at hand when required. There would also be the danger of lighting up the roads for the benefit of the retiring troops, and thus accelerating their retreat.

2. *The attack of an enemy in position:—*

Night marches are divided into night advances and night attacks, considered tactically. A night advance may culminate in a night attack, or the attack may be delayed until dawn. The length of the advance may vary from 2000 to 3000 yards, to 8 or 10 miles. So far as our present enquiry is concerned, a night advance will only be considered when it is within range of a searchlight, which is from 3000 to 4000 yards.

The advantages the attacker hopes to gain from a night attack are surprise, and the avoidance of the heavy loss of an advance under fire. The disadvantages are the loss of control by the officers, owing to the impossibility of their being able to see, and properly superintend the men; the fatigue inseparable from marching at night; the difficulty of keeping the right direction; the liability to panic; and lastly, the demoralisation and loss inseparable from an unsuccessful night attack. The failure of an attack by daylight, especially if it occurs late in the day, can be partially redeemed under cover of the succeeding darkness. On the other hand, the withdrawal of men after an unsuccessful night attack, in the ensuing daylight, offers a most favourable opportunity for an enemy's counter-attack.

As previously mentioned, searchlights may be used, either for screening purposes, lighting up the target, or for dazzling the opponents; and it is proposed to consider night operations with a view to ascertaining during which particular phase they can best be employed. In order to do this, tactical night advances may be considered roughly under three headings, and in discussing them, it is proposed to deal, as far as possible, with concrete examples.

(a). A night advance as a preliminary to opening a battle; or a night advance during a battle to gain a better fire position, from which to continue the fight next day.

(b). A night advance culminating in a night attack, or an attack at dawn.

(c). A night assault from a position, gained during daylight, within reach of the enemy's trenches.

(a).—A night advance as a preliminary to opening a battle; or a night advance during a battle to gain a better fire position from which to continue the fight next day.

Of this operation perhaps the best example occurred at the battle of Nanshan on 26th May, 1904.

Having reconnoitred the position some days previously, General Oku issued orders to the following effect:—

1. The 1st Division will move under cover of night, and occupy by 3.30 a.m. a line stretching from, &c., &c. Part of its artillery will

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take up such a position, under cover of darkness, as will allow it to fire on Chin-Chou.

2. The 4th Division will move under cover of night, and occupy by 3.30 a.m. a line, &c., &c. Part of its artillery will take position so as to fire on Chin-Chou, &c., &c.

Similar orders were issued to the remainder of the troops.

The positions indicated were occupied without interference by the Russians, and subsequent operations resulted in the capture of the Nan-Shan position. The Russians had mounted four searchlights, and these, as well as the dynamo and engine, fell into the hands of the Japanese. It is not known whether these searchlights were running, or whether attempts were made to discover the movements of the Japanese; but in any case, as the Japanese were some 5000 to 6000 yards from the Russian main position, it is unlikely that the lights would have been much advantage.

The Japanese, as the attackers, made their dispositions irrespective of the position of the Russian forces. Secrecy was not essential to them; but was an advantage. Searchlights would have lighted up the ground over which the troops had to pass and thus have assisted them, but would almost certainly have drawn fire from the Russian position, which might, or might not, have caused loss and confusion. Whatever advantage might accrue from secrecy would have been lost. Darkness acted as a screen, and it was not required either to dazzle the defenders or to light up their position.

With regard to the latter part of *(a)*, "an advance during a battle to gain a better fire position," of which there are numerous examples during the fighting south of Liaoyang, between the 23rd August and the 3rd September, 1904, much would depend on the proximity of the rival forces.

If only separated by some 700 to 800 yards, secrecy would be essential to the attacker in order to avoid attracting the fire of the defence, or possible counter-attacks. It is true that a "beam" might be used to attract the attention of the defenders to another part of the field; but this would be more of a secondary than a primary use of the searchlight and the possibility of employing it in this way would not of itself be sufficient to justify its presence.

When separated by 1000 to 2000 yards, each force would probably be covered by a screen of outposts or advanced posts. If it were not intended to advance beyond the enemy's outposts, then secrecy would be an advantage, and searchlights unnecessary. If, on the other hand, the hostile outposts had to be driven back, searchlights, if skilfully directed, could be used to screen the advancing troops and to show up the ground they were to occupy.

(b).—A night advance culminating in a night attack, or an attack at dawn.

There are several good examples of this in the earlier phases of the South African War. The two it is proposed to consider are Stormberg and Magersfontein, as they are each illustrative of a particular type; the former, involving a strategic movement by rail from Putterskraal to Molteno, followed by a night advance of between

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9 and 10 miles; the latter, a night advance of about 2¼ miles only, following on a march of 4 miles the previous afternoon.

The success of the operations culminating in Stormberg was based on the assumption that the Boers did not expect an attack, and that the British troops could be deployed within striking distance without alarming them. Searchlights would have been useful in facilitating the night march of the troops; but it is inconceivable that they could have been so used without attracting the attention of the Boers, and, consequently, ruining whatever chance of success the operation may have had.

Magersfontein offers a very different set of circumstances. The Boers were well aware of the position of the English forces within striking distance, and from our tactics at Belmont, the Boers had reason to expect a night attack. The bombardment of the 10th December had confirmed their suspicions, and all the commanders were thoroughly on the alert on the night of the 10th-11th December. Under these somewhat exceptional circumstances, searchlights would not have been disadvantageous to the attackers, if the weather had been favourable, and if satisfactory sites for projectors and observing stations could have been found in the short time available. The tactics of the lights would have been to concentrate on a part of the defensive line some distance from the point of assault; thus hoping to attract attention away from the Highland Brigade. The night advance would have been facilitated by the diffused light of the beams, and the direction more easily maintained.

Supposing, however, that the circumstances had been such as Lord Methuen hoped, that is to say, that the Boers were shaken by the previous bombardment and did not anticipate a night attack. Then searchlights—as in the case of Stormberg—would have robbed the attack of one of its chances of success, namely, surprise.

(c).—A night assault, from a position gained during daylight, within reach of the enemies trenches.

In South Africa there were few operations of this nature attempted by either side, though the campaign in Manchuria was prolific in them. It is, therefore, proposed to consider an example from this latter war, the now famous night assaults at Manjuyama on the 1st and 2nd September, 1904. Manjuyama is an insignificant looking spur running down from hill No. 920 on the right bank of the Tai-tzu river. The length of the spur is about 1½ miles, and it was garrisoned by the 137th Russian Regiment. On the 1st September the Japanese 15th Brigade, advancing on the left of the 12th Division, made a vigorous, but unsuccessful attack on the spur. The whole country was covered with kaoling about 10 feet high, and the terrain on the Japanese left was much intersected and cut up by ravines.

The action continued until dusk, when the gun and rifle fire attained its greatest intensity.

Impressed by the determined advance of the Japanese, the Colonel commanding the Russian Regiment prepared for a night attack. His instinct was correct. At 7.20 p.m. the Japanese 15th Brigade advanced to the assault. The 4th battalion of the Russian Regiment, on which the first brunt of the attack fell, was seized with

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panic and fled, but was shortly afterwards rallied. By 11 p.m. the Japanese were in possession of the hill, which they held and entrenched, in spite of two counter-attacks by the Russians. The Japanese total loss in the 2nd and 12th Divisions on the 1st September was only 100 killed and 387 wounded. The Russian opposition cannot, therefore, have been very serious.

During the 2nd September, the Russians realised the importance of the Manjuyama position and determined to re-take it by a night attack. The attack was prepared by a heavy bombardment of some 152 guns, continued until 7 p.m., when the infantry attack commenced. Thirty-six battalions had been detailed to take part in the operation. They were formed up in three columns.

Left column—7 battalions.
Centre column—13 battalions.
Right column—7 battalions.
In reserve at Sha-ho-tun, some 2 miles distant, 9 battalions.

It was dark when the troops moved off. The direction was so badly kept, that more than once the men opened fire on their friends and even attacked them with the bayonet. The attack reached the top of the hill however, and hand grenades were hurled into the Japanese trenches. By 8.30 p.m. the attack had been everywhere repulsed. A little later some Russians crept up to the crest of the hill, threw down and ignited some magnesium balls. The Japanese trenches were brightly lit up and heavy volleys were poured into them by the Russians. Efforts were made by the defenders to extinguish the lights by throwing stones at them, but were unsuccessful. A Japanese soldier, shouting out his name and regiment, in accordance with their custom, sprang from the trenches and extinguished the lights with the butt of his rifle.

About 9 p.m. it was impossible to distinguish friend from foe, and General Okasaki, commanding the defenders, ordered the "cease fire" to sound. The firing ceased on the Japanese side, and the position of the Russians could be distinguished by the flash of their rifles. Shortly after this the Japanese were reinforced by another battalion and the Russians were driven back, leaving 300 dead, including three regimental commanders, on the hillside. At 2 a.m. the Russians made another effort. Lieut.-Colonel Matov led a mixed force of five battalions against the hill, supported by two battalions of General Vasiliev's force. By this time the moon had risen, and the Colonel commanding the 30th Japanese Regiment fell on the flank of the Russian line as it was advancing towards the hill. The Russians halted, and fell back finally on their reserves at Sha-ho-tun. It is difficult to ascertain the Japanese casualties, but the whole of their 2nd Division lost 177 killed and 646 wounded on the 2nd September, and of these, the bulk of the losses occurred at Manjuyama.

In the above briefly described operations, it is noteworthy that the Russians expected the Japanese assault; and the Japanese similarly anticipated, and were prepared for the Russian counter-assault. Neither side attempted secrecy, nor apparently hoped to surprise his opponent. There was no reason, therefore, why search-

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lights should not have been used by either side if they had been available.

In the case of the Japanese, the assault was pushed forward so rapidly and with such determination that success was assured from the outset. Darkness screened the attackers; they required no target, trusting as they did to the bayonet. There appears to have been very little confusion or intermixing of units so that searchlights could have added little to the success.

On the other hand, the Russian attack was ill-conceived, badly directed, and apparently lacking in one of the first essentials of success in night assaults—the determination to close with the enemy. The massive Russian columns would have been difficult to direct in daylight. It is, therefore, not surprising that they fell into confusion at the commencement of the advance. The aim of the Russians appeared to be rather to overwhelm their opponents, by sheer weight of numbers, than to drive them from their trenches by the vigorous, determined advance of small, well-directed columns, converging on a common objective. Probably the Russian tactics were to some extent actuated by the desire to give their men the moral support of large numbers; but whatever may have been the cause, where it is intended to repeat these tactics searchlights should be employed.

During the advance, their light would obviate much of the confusion and intermixing of units, assist in maintaining direction, and possibly act as a screen. At the assault, friend and foe would be shown up indiscriminately, but this would not be a grave disadvantage where the attack could bring forward overpowering numbers and were not liable to be delayed under fire by obstacles, the more especially as the light would be behind the stormers. Then, there would be the moral support of the lights themselves, which would be considerably enhanced if artillery fire were used in conjunction with them. It is improbable that artillery fire would have any material effect owing to the difficulty of ranging and observing the fire with searchlights; but as has been so frequently proved in daylight, the moral support of artillery is often of itself sufficient to steady and carry forward wavering troops. That the Russians at Maju-yama felt the necessity for some form of light is shown by their use of magnesium balls, and it is also clear, by their efforts to extinguish them, that the Japanese considered them a disadvantage. But the example is not convincing, as the only use the Russians made of their opportunity, was to "pour volleys into the Japanese trenches," tactics hardly to be commended in night attacks, nor likely to drive a determined foe from his position. Further, the brilliant counter-attack by the commander of the 30th Japanese regiment, on the flank of the advancing Russian column, exemplifies the danger to which an attacking column would be exposed, if shown up by its own searchlights.

B. THE DEFENCE.

The converse of much of what has already been said regarding the attack naturally applies to the defence. To avoid surprise, to delay the enemy under fire by means of obstacles, and finally, to meet him with equal, if not greater, numbers at the point of the assault, are the tactics of the defence. All this implies early information of the

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impending attack, which can be obtained by two methods, searchlights or standing patrols in combination with outposts. The radius of searchlights has already been stated—3000 to 4000 yards—consequently beyond this distance, standing patrols must in any case be used. Forces separated by as much as 4000 to 5000 yards would be covered by outposts and these should give ample warning of an impending attack. Searchlights in exceptionally favourable country might, if skilfully used, cover the withdrawal of the outposts and light up the hostile forces as they advanced. Where the forces are within 600 to 700 yards, searchlights would be invaluable to the defence, if they could be kept doused until the attackers had arrived within 200 to 300 yards of the trenches, and then suddenly opened; providing they were directed so that they in no way screened the view of the defenders, and the trenches were not illuminated—both of which conditions are most difficult to fulfil. If a number of small lights were used, they should be sited close to, and at a lower level than, the trenches; in which position they would be particularly vulnerable to fire, and in case of retirement, would fall into the hands of the attackers.

There are other difficulties to be faced by the defence. The extent of ground occupied by modern armies renders it impossible that the whole front could be illuminated, and who is to decide on which particular point the assault will be directed. Had the Boers been in possession of searchlights at Magersfontein, would they have illuminated the point selected for assault by the Highland Brigade? Probably not. At Liaoyang it is extremely unlikely that the Russians would, out of the 45 miles of front on which they were attacked, have selected Manju-yama as the point where searchlights should be installed, and yet sites and directing stations for the lights can only, with great difficulty, be improvised. The moral effect of searchlights has been briefly touched on and there can be no doubt that it would be considerable. For the attackers to see their objective and the obstacles they have to surmount would, to a large extent, lessen their difficulties; and, the relief from the nervous strain of facing unknown dangers might compensate for an increased casualty list. Somewhat similar considerations affect the defence, and it must remain a matter of opinion as to which side will reap the greater benefit in civilised warfare, from the point of view of moral. In savage warfare, searchlights would always be a valuable asset, from their novelty as well as from the superstitious fear they would arouse.

THE ATTACK OF SEARCHLIGHTS.

The possibility of neutralising a searchlight by the use of a stronger beam has been mentioned. The advantage of the stronger beam is very considerable, and where searchlights are available this method would be used in the field. The alternative method is to attack them by fire—artillery and infantry.

Artillery fire directed at a searchlight from a distance, even though the range were approximately known, would probably be ineffective at night, though a lucky shot might disable the projector or engine. If, however, trained observers connected by telephone

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could be pushed close in, keeping as far as possible to the flanks and out of the direct rays of light, it would greatly assist the battery commander; but even then the chances of obtaining a direct hit would be small. Howitzers firing high explosive shell would be useful in wrecking the entrenchments protecting the light or engine, though shrapnel bullets would probably be sufficient to disable the projector. Mountain artillery and machine guns, where cover existed for getting them to close range, could be used with effect.

Infantry fire would be mere waste of ammunition unless from very close range. If storming columns were allowed to halt and open fire at the light it might be difficult to get them forward again. It would therefore be preferable, to send forward selected scouts, suitably dressed to harmonise with the background if possible, with instructions to creep close to the light before opening fire. The attacking columns meanwhile being posted in readiness to advance at a given signal. This method, it must be confessed, seems cumbersome and complicated for nightwork, but there seems no alternative for the infantry. A combination of infantry and artillery fire could be tried, in which case the artillery observers connected by telephone with the batteries should be with the advanced infantry.

CONCLUDING REMARKS.

In an article in the "Revue des deux mondes," General De Négrier states:—

"During the night of the 28th February, the Russians, in spite "of the Japanese searchlights captured the Sha-ho "tête de pont" "and held it." Later, in speaking of the lessons to be deduced from the campaign, he adds:—

"Night attacks will be constantly employed. By using echelon "fire, artillery will often be able to join in, if it has a sufficient "number of searchlights. For the latter, one wagon with six horses "to carry three batteries is enough. It carries the gas engine, the "dynamo, and the searchlight. The latter can be carried up by hand, "so as to be put on the crest, whilst the cable is unrolled and the "engine and dynamo are established under cover some distance away. "This large number of searchlights is necessary, because on the "ground-level, a satisfactory view can only be obtained by the con-"vergence of two shafts of light from a distance on the same point. "It will be useful, therefore, to combine the action of the searchlights "in several groups."

Nothing is said as to how the infantry are to be assisted by searchlights. Yet surely they, on whom the brunt of the fighting must fall, should be considered as much as the artillery. If infantry are supplied with them, who is to be the directing authority? A large number of searchlights independently directed would probably be as harmful to friends as foes. General de Négrier hardly seems to appreciate the difficulties of directing and siting searchlights.

Captain A. Degtyarev in the "Vovenni Sbornik," in writing of artillery in defence at night, in the action of Kun-tu-li-chun on the 2nd and 7th March, 1905, states:—

"Searchlights would, of course, be invaluable on such occasions, "but we did not make use of them during the fighting on the Sha-ho.

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"At Su-chia-tun station we had several searchlights mounted on "trucks, and one was employed behind the village of Khan-chen-pu, "but it gave only a feeble light. The Japanese used searchlights "whenever the nights were dark, and our casualties were in conse- "quence considerably increased." This statement throws little light on the subject. More details would be required before any conclusions could be arrived at.

There is a secondary use for searchlights, and that is signalling. We had experience of this in our own war in South Africa; and their usefulness in this capacity seemed almost sufficient to justify their inclusion in our field army, if only in small numbers.

SUMMARY.

1. The value of searchlight in siege or field operations is doubtful, and more experience is required before a definite opinion can be given. Possibly some form of magnesium rocket, fireball or star shell, may be found equally efficacious and less expensive.

2. With determined troops the occasions are exceptional when searchlights would be of much value to the attack, though they would be useful in counteracting any employed by the defence.

3. In the obstinate defence of a position, where the terrain was suitable, and time available to select good sites, they might be a valuable asset to the defenders in particular localities, especially if they came as a surprise to the attackers, but definite rules for their employment cannot at present be formulated.

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Automaticity (plus accuracy).

By COLONEL H. S. HORNE, R.H.A.

AS a practical gunner, I most cordially applaud the principle of "Automaticity," so ably laid before us by Captain Fulton, in the July number of the "Journal."

I am entirely in accord with every word that Captain Fulton writes in support of "Automaticity," and I only put pen to paper to urge that with "automaticity" we must combine "accuracy."

Error in shooting arises from many causes, and it must be our aim to reduce such causes of error, not to aggravate them by employing inaccurate instruments.

Take the case of our plotter, to which instrument Captain Fulton especially refers.

I pass over possible error due to dependence on accurate range taking, and recognise that the plotter does its best with the angle we give it, but unfortunately that angle is not accurately measured. We endeavour to find it with the director, but the present pattern of director cannot be depended upon to measure the angle "in the plane," and unless we measure the angle T O B in the plane T O B, the plotter will not read the true battery angle.

Error on the same lines creeps in with some instruments designed to enable the observer at O to ascertain the angle of sight from B to T. Unless the inclination to the horizontal of the line B T is dealt with in the vertical plane, the angle of sight recorded will be incorrect.

"Automaticity" by all means, but automaticity plus accuracy if possible.

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The use of Pack Artillery in Civilized Warfare.

By MAJOR K. K. KNAPP, R.G.A.

AS modern weapons increase in accuracy, so does the infantry attack become more difficult of execution without the close and effective co-operation of artillery, and it is a question of much import how this close support is to be assured. The only position for batteries detailed to closely support attacking infantry is a forward one, for artillery support from long ranges, or even long effective ranges, must always fall short of what is required, when the infantry approaches the final stage of the attack and distance makes distinction between the position of friend and foe difficult to determine.

"Field Service Regulations, Part I.—Operations," is quite clear on this point. In speaking of the decisive attack, it says:—

"The principle of the employment of the artillery in the battle "is that the greater the difficulties of the infantry, the closer must be "the support of the artillery."

And again:—

"A portion of the artillery must be pushed forward to within "close artillery ranges, so as to be able to deal with possible counter-"attacks, and to give the infantry immediate assistance, when the "fluctuations of the fight make this necessary."

And further on, with respect to the counter-attack in defence:—

"It will generally be advantageous from the point of view of "moral, for some guns to accompany the infantry, so as to be able "to come into action at close artillery ranges."

But the chief obstacle to this effective co-operation is the difficulty of pushing artillery forward to close artillery ranges under hostile Q.F. gun fire so long as nothing but wheeled artillery finds a place in the field army at home. The Q.F. field artillery is too valuable an asset to the army commander to be uselessly sacrificed in an endeavour to effect the impossible, and as the artillery of that field army is now constituted, the infantry cannot rely on close support under all normal conditions of warfare.

Even in battles of encounter, the batteries of Q.F. guns must be practically left out of account, for no matter how strong a spirit of self-sacrifice pervades the personnel, they will rarely be able to take much part in closely supporting infantry in the final stages of attack, especially upon an entrenched position. Even if they could get to close artillery ranges, their fire would have no searching effect, and the flat trajectory of the gun precludes the use of cover at such short ranges, while to come into action in the open, in the face of modern Q.F. artillery, would be little short of impossible.

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As things are, therefore, close support must be given by the field howitzer batteries, and when these are re-armed with the 4·5″ howitzer, their support will be highly effective at close artillery ranges, provided conditions are favourable to these batteries getting into action there.

Where the terrain of the battlefield offers facilities for batteries of wheeled artillery to move to close ranges by concealed routes, and covered positions are available, or where the protracted nature of the operations enables batteries to be moved into covered or entrenched positions at short ranges under cover of the darkness, then the infantry can feel assured of close and effective support. But what if the country is open, offering little concealment, or broken, or enclosed, and difficult for the movement of wheeled vehicles.

The war in Manchuria has taught us what to expect if wheeled artillery on the move comes under the effective fire of hostile Q.F. guns, while if the ground is too broken to admit of the free movement of wheeled vehicles, the infantry must, in the absence of some more mobile form of guns, be denied the close support, which they look for at the critical stages of the fight.

It is evident then, that to ensure co-operation under all normal conditions of war, the artillery of the field army requires some batteries mobile enough to accompany the infantry wherever they go, and this is the use of pack artillery in modern civilized warfare.

Pack artillery is peculiarly suited for this rôle of auxiliary to the infantry. It can go practically anywhere that an infantryman can go without using his hands and can easily traverse woods, and difficult or enclosed country, which would be impassable to wheeled artillery, unless roads exist or passages have been previously prepared. And as cover can be obtained for laden mules from hedgerows, undulations of ground, thin scrub, &c., which suffice to conceal a man standing upright, a battery of pack animals may often be able to reach close ranges undetected by the enemy, where wheeled artillery could not conceal its movement.

Again, if the advance has to be made across the open and under hostile fire, a battery of pack animals has much advantage, for not only is it more suited by its composition to open out and work its way forward gradually over the fire swept zone, but it is less liable to be stopped by casualties than a battery of wheeled artillery. A man or a mule shot does not stop the remainder, and it is possible to bring up by hand, or on spare mules, any part of the gun or equipment left behind on the ground through casualties; whereas with wheeled artillery, the gun or wagon is brought to a standstill and exposed to destruction, if a team horse is shot when moving under fire, and a casualty among the drivers might be equally disastrous.

In fact, if mobility on the battlefield means ability to move, as assuredly it must under the conditions imposed by modern arms of precision, then pack artillery is without doubt the most mobile form of artillery, and the only sure means of providing infantry with the close support, which they will constantly require, when they come under the effective fire of the enemy's infantry.

Therefore each infantry brigade should have a battery of pack artillery allotted to it, as cavalry brigades have their batteries of horse

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artillery, and the battery should form an integral part of the brigade in the field. The normal position for these batteries in the advance would be with the brigade reserves, but on occasion, in enclosed country for instance, a position nearer the firing line might be found more suitable for giving close and immediate support.

The tactical employment of these batteries with infantry in the attack should be as follows:—

The batteries of pack artillery accompany the infantry in the advance, while the field and heavy artillery occupy positions of observation or readiness to support the advance of their infantry by engaging the enemy's artillery directly it discloses its position. When the advancing infantry forces the enemy's artillery to open fire, the field and heavy guns reply to such an extent as may be necessary to assist the advance, and endeavour by their fire to draw the fire of the opposing artillery away from their infantry, until gradually all the divisional artillery is drawn into the fight, and a duel for superiority between the two artilleries is developed.

During this stage, the batteries of pack artillery must continue to advance with their infantry brigade reserves, taking every advantage of cover of features of ground and usually without coming into action, until these reserves arrive within 2000 yards of the enemy's position. The batteries then come into action at some forward position, from which they can best assist the attacking troops in their further progress, either by shelling advanced posts held by the enemy, if these are met with, or by attacking the enemy's infantry in their main position.

Communication being easy between units so approximate to each other, the forward rushes of the infantry can be accurately timed to coincide with bursts of fire from their auxiliary batteries. The fire of each battery of pack artillery must be directed under the orders of the infantry brigadier upon such part of the enemy's position as is most harassing to the advance of his own or neighbouring brigades, if others are co-operating, so as to facilitate to the utmost the advance of the attacking troops. This may often be best attained by enfilading parts of the enemy's line, for which opportunities will sometimes occur from the forward positions, that the batteries of pack artillery occupy.

The moral effect upon the infantry of having guns close at hand, whose whole object is to help them forward, must be great, and the actual effect of the fire of batteries, which are in immediate touch with the infantry situation, would be no less valuable.

As the infantry get to within decisive range of the enemy's position, and the third stage of the attack, or the struggle for fire superiority begins, the fire of the field artillery, in so far as it can be spared from the artillery duel, will be turned upon the enemy's infantry position to prepare the way for the final assault. It will generally be desirable at this period for the batteries of pack artillery to support their infantry even more immediately by advancing to closer range, if suitable positions can be found more forward. For it is then that there is the greatest danger of local counter-attacks, and it is to assist the infantry against these, that the close and timely support of guns will be most urgently required.

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When the fourth stage of the attack, or final assault takes place, it will generally be necessary for safety to lengthen the range and fuze of the field guns, and assist the infantry by covering the ground in rear of the enemy's position with shell, so as to prevent hostile reinforcements getting forward to the firing line. But the fire of the pack artillery howitzers, from close artillery ranges, can be continued with safety upon the enemy's infantry position till a much later moment, thus assisting the infantry over the most difficult task of all, that of crossing the last 600 yards of the attack. If the enemy can be kept down in their trenches by the searching fire of howitzers, till the assaulting troops have arrived within a short distance of the enemy's position, the chances of the assault failing will be much lessened.

If the assault succeeds, the batteries of pack artillery advance at once to the position gained, and support the infantry in maintaining their ground. And if the assault fails, these batteries cover with their fire the withdrawal of their infantry.

The foregoing shows how the divisional field and heavy artillery will direct their efforts throughout the fight towards generally assisting the attack of the infantry brigades as a whole, first by engaging the enemy's artillery, and then by preparing the way for the final assault; while the attention of the batteries of pack artillery will be concentrated upon furthering the progress of their own infantry brigades by breaking down local opposition, and finally supporting the assault up to the latest possible moment. Thus will co-operation between artillery and infantry be complete, and there will be little reason in future for infantry officers to feel that the whole artillery scheme of operations in the attack is based on the preliminary stages.

What has been said of the attack, applies equally to the counter-attack in defence, while in the earlier stages of the defensive battle, batteries of pack artillery will, by their mobility, be often used in advanced positions, where the ground admits of these being advantageously occupied.

Before leaving the tactical side of the question, it is necessary to mention briefly some other uses, for which pack artillery will be invaluable in civilized warfare on account of its mobility and portability.

In mountainous country.—When parts of the theatre of operations are mountainous, there will be a possibility of movements being carried out in those localities, and pack artillery is the only nature of artillery which can take part in such operations. This the Russians learnt to their cost in the late war, and it is feared that we too may learn it similarly on the battlefield, if the present want of pack artillery at home is not remedied.

With oversea expeditions.—For landing with the covering force, when disembarkation has to be carried out on a hostile coast. Pack artillery equipments can be quickly landed and easily transported about by hand for some distance, but if this nature of artillery is not available, the infantry will have to cover the disembarkation without artillery support until batteries of wheeled artillery have had time to mobilize on shore.

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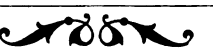
Similarly, when the passage of a river has to be effected by means of boats in the face of opposition, pack artillery will be very useful for sending across the river immediately a lodgment has been made on the other bank to support the infantry, until the wheeled artillery with its horses can be transported over.

Tactically employed as suggested above, the batteries of pack artillery would be at all times a source of moral support to their infantry brigades, but support to be real must be something more than moral, it must be effective also, that is to say the effect upon the enemy must be actual. Therefore these batteries must be suitably equipped for the rôle of auxiliary to the infantry, and a weapon must be specially designed for the purpose. Close and effective support of the infantry is what is required, and for this, high angle fire and a comparatively powerful shell are the chief desiderata. Q.F. guns will be no good. The equipment must be a howitzer, and it must be designed for short range shooting, as experiments have shown what complications arise, and how much power may be wasted in endeavouring to design a weapon, which will be equally of use for long range shooting in the hills.

The howitzers will be chiefly used at close artillery ranges, and will rarely be called upon to fire over 2500 yards, except when opportunities occur for enfilade fire from forward positions. It will suffice, therefore, if the weapon is designed to shoot with great accuracy up to 3500 yards, and complete stability under 15 degrees need not be insisted upon. The howitzer must be suitable for pack transport, easily taken to pieces and put together again, and must fire case ammunition to prevent any risk of projectiles slipping back in the chamber at high elevations.

Judging by the experience gained from experiments which have been recently carried out with mountain equipments, it should be possible to manufacture a pack artillery howitzer fulfilling the above conditions, and capable of firing a 25lb. shell. Armed thus with a high angle fire weapon of greater shell power than the Q.F. gun, pack artillery would be suitably equipped for co-operating immediately with infantry brigades. The fire from these howitzers would be highly effective at close artillery ranges, and the attacking troops would be assured of the very real support that they require, when they come under the effective fire of hostile infantry.

It is only lately that the use of pack artillery in support of infantry has received any recognition in our official textbook of training, and we, who believe that pack artillery will prove the best means of providing close support for the infantry on the battlefield, must wait till the recognition takes practical shape in the formation of batteries at home. When that is done, the use of pack artillery in civilized warfare will be finally appreciated.



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Some reflections regarding the Training of R.A. Territorial Officers.

Arising out of the article by "Artilleryman" in "The Journal of the Royal Artillery," May, 1910.

By CAPT. E. B. KIRBY, 3rd W. Lancs. Bde., R.F.A.

THE majority of the suggestions and precepts embodied in the article by "Artilleryman" appear on the whole to be beyond criticism and should command the respect which is due to expert opinion, but nevertheless it may not be out of place to offer a few comments from the point of view of those for whose instruction it is written.

It may be as well to state at the outset that the present writer does not lay claim to any authority either for his own views, or those which he may hypothetically attribute to others.

The author of the article in question points out the means by which an officer can best ensure the confidence and discipline of the troops under his command, but he does not particularise what one may term the personal aspect of their relations. It may be urged that an officer may fulfil every requirement suggested in such a way as to earn the confidence of his subordinates in his ability, and yet fail to acquire their esteem and affection. The qualities requisite to stimulate these sentiments are so peculiarly a matter of individual temperament, that it is doubtless wiser not to generalise in an article which merely professes to formulate rules of training. However, it may not be inappropriate to remark on the value of such qualities as humour, patience, justice, and the confidence of an officer in his own judgment.

The two last may often be found to conflict. An officer should, therefore, be careful not to adopt too definite an attitude on a contentious question, unless he is satisfied that his sense of justice will not ultimately compel him to retreat from it. Any such retraction is almost certain to be construed by his subordinates—however unreasonably—as ignominious, and he is more likely to be despised for his vacillation than commended for his fairness. In fact, such a situation confronts him with a dilemma from which it is extremely difficult to extricate himself without, to some extent, losing the respect of his men. It is essential that the soldiers under his command should have confidence in their superior to weigh fairly and judicially any matter affecting their personal honour or welfare.

The importance of patience is sufficiently obvious to any officer with a sense of proportion, as is in fact sufficiently elaborated in the article we are reviewing.

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Not so humour. If an officer cannot appreciate this quality and know when its exercise is advisable, no power on earth can teach him. It is sufficient to remark that an officer's bearing towards his men should not be founded on the attitude of a clergyman to his congregation in church.

This quality is especially useful under difficult or dangerous circumstances, when a humourous, or even commonplace, remark is more valuable in restoring nerve and confidence than a harsh and bullying manner. Soldiers—at least those in the Territorial Force—dislike a bully above everything. The avoidance of this defect does not involve any loss of dignity, nor the encouragement of familiarity. Both extremes are most prejudicial to true discipline.

The author of the article elaborates an argument to demonstrate the reason why Territorial officers do not sufficiently study the administrative methods of the army. I am not inclined to dispute the fact, but am compelled to submit that in assigning a reason for it "Artilleryman" bases his argument upon a false premiss. He says, "First and foremost the majority of officers joining the Territorial "Forces do so, not so much from motives of patriotism, as from a "desire to find pleasant and, at the same time, worthy occupation for "their leisure time."

This statement is diametrically at variance with the experience of the writer. It is possible that anyone who contemplates applying for a commission in the Territorial Force does not—even to himself—care to label his aspirations by the word patriotism. But so far from imagining that his duties promise him a pleasant means of occupying his spare time, the requisite call upon his leisure which he anticipates—and generally exaggerates—is precisely his principal stumbling block. His military duties may, or may not, prove congenial to him, but one fact is clearly present to his mind, viz., that he is undertaking an arduous responsibility which is bound to entail considerable sacrifices. He knows—if he is a person of average intelligence—that he is adding to his life a new career, probably irksome, and certainly unremunerative, the logical and obvious conclusion of which is to jeopardise and handicap his prospects of success in his normal avocation. No one can dispute the last statement who appreciates for a moment the effect of mobilization, followed by a protracted war, upon a man whose profession or business depends upon his individual effort.

It would be out of place to do more than allude to the anomalous comparisons which his common-sense compels him to draw between his own position and that of those who elect to shirk their acknowledged responsibility. It is sufficient to conclude that only childish ignorance can induce a man to regard the career upon which he contemplates entering, as merely a pleasant and worthy means of occupying his leisure time.

I should be disposed to attribute the Territorial officer's alleged ignorance of military administration to the fact that this branch of knowledge does not happen to be insistently brought before his notice in the course of his practical work. He finds that the practical details of his ordinary duties are sufficiently onerous and diversified to distract his mind from more remote problems, however important they may be. The blame appears to attach more to the system of

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his training, and his necessarily limited opportunities, than to any shortcoming on the part of the individual.

A cynical observer might draw an analogy between the regular and territorial officer to the effect that both occupy their leisure in the pursuit of their military duties. Our cynic might, however, hesitate in applying his analogy to the employment of their working hours beyond the fact that both devote them to what they consider the more serious aspects of life. But whereas in the case of the Territorial, these represent the labour and monotony of his daily avocation, in that of the regular they are mainly occupied in perfecting himself in those sports and pastimes of which his opportunities enable him to become so able an exponent.

The Territorial officer is further enjoined to avoid destructive criticism of army administration, and to be loyal to his calling.

In the first place, it may be observed that intelligent criticism does not imply disloyalty. In fact the more devoted a man is to his work, and the more he identifies himself with it, the more prone he becomes to notice systematic defects and desire their remedy. It is undoubtedly just to urge that he views the question more or less from the standpoint of an amateur, but nevertheless his criticism upon regulations which apply to the Territorial Force cannot be regarded as negligible. If his judgment is handicapped by his failure to appreciate the military point of view, he may retort with some show of reason that the regular soldier does not allow sufficiently for the exigencies of the civilian. The answer suggests itself that an officer of the King should endeavour to dissociate himself as speedily as possible from the temperamental standpoint of a civilian. It is not the intention of the present writer to embark upon a discussion as to the extent to which the Territorial officer, or the service to which he has the honour to belong, is the gainer or loser by his protean character. But the essential fact must be faced, not merely by himself, but also by the military authorities who are responsible for his training, that he is, and must be, primarily a civilian. By far the major part of his time and attention is occupied in civilian affairs, to which in fact he must look for his livelihood. He is trained and encouraged to think for himself, to form his own conclusions about men and things, and to prize the independence of his judgment. To him, as an elector, all important questions of national policy must ultimately be referred. He can hardly escape the contrast between the unquestioning acquiescence which he is asked to accord to military administration, and the unfettered latitude of opinion which is not only allowed to, but expected of him, in matters of equally serious moment.

It is idle to shirk the fact that occasions arise when the somewhat arbitrary regulations of military administration irritate and shock a sense of justice which is trained to regard the consideration of individual rights as being of paramount importance.

It might appear from the above that the writer is attempting to arrive at a different conclusion from the author with reference to matters of military discipline. This is very far from being the case, but it is only fair to emphasize the difficulties which necessarily beset the average Territorial officer under the existing system. It is hard to see what good object can be served by attempting to minimise or

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discount so fundamental a question. That such difficulties should arise appears inevitable when the same method of administration must be enforced equally on a regular soldier, whose life is passed in the profession of arms, upon which he may depend for his livelihood, and the Territorial, to which it is almost a work of supererogation.

It is true that these considerations are of so general a character as to lie beyond the scope of the article in question, which is merely directed to educate the Territorial officer in practical efficiency. If one accepts the present conditions of his service as the best possible foundation on which to build up a military career, calculated to do credit to himself and his country, there can of course be no occasion to do more than consider its practical development. The writer has no desire to minimise the vital necessity of anything that can promote general and individual efficiency. It is unquestionably a soldier's immediate and primary duty to perform his service loyally under the best conditions or the worst. But, nevertheless, when a remedy is being sought for the obvious shortcomings of the territorial officer, the most superficial analysis cannot avoid the fundamental difficulties by which his best efforts are so heavily handicapped.

Though these should not be—and, I believe, are not—made an excuse for shirking the responsibility he has involuntarily incurred, their weight must not be ignored if he is tried in the balance and found wanting.

It may appear that so obvious a point has been laboured somewhat too heavily. If its recognition were more general, greater progress might conceivably have been made with the more interesting and pleasant aspect of the subject, viz., the best means by which the efficiency of the Territorial officer may be attained.

Theoretically, the recommendations of "Artilleryman" leave little to be desired. The more opportunity the Territorial officer can obtain of coming into contact with regular troops belonging to his own branch of the service, the better for him. He must have a standard of comparison, since he can never truly guage the level of his own proficiency until he sees for himself how well the thing can be done. While such experience will cure any inclination to presumption, it may incidentally also save him from despair, inasmuch as he will probably find that many familiar defects he has deplored in his own case, are not unknown to regular troops.

But when we consider this excellent advice in the particular form presented in this article, its practical difficulties appear almost insuperable.

"Artilleryman" suggests that the Territorial officer's first training should be passed with regular troops. It may at once be remarked that a commission in the Territorial Force is not obtained by examination, but merely by application—coupled, of course, with general suitability. The result is that the new subaltern is at first absolutely ignorant of his most elementary duties. In the case of the artillery, at least, the first few months of his training are occupied in wrestling with an intricate maze of highly technical details, from which he emerges—breathless indeed—but far from triumphant. The subjects of his syllabus are so intricate and diversified that he may congratulate himself when he arrives at a knowledge of the limits of his ignorance.

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Let us suppose that at this stage (which is not a momentary one) he goes into training with a regular artillery brigade or battery. Even if he appreciates the duties of his rank, he probably does not know how to perform them. It is true that he goes there for the purpose of learning, but it is asking too much of the officers of the battery to interrupt the training of their own unit for the sake of a man whom they will probably never see again, and in whose career they cannot be expected to simulate much interest.

If he has already had some experience of his work, and does not require to have every word of command and each detail of drill explained to him, of course that is another matter. But our remarks refer merely to the first training of the newly joined subaltern, who has not had the advantage of a sound preliminary training at Woolwich.

In conclusion, the writer does not for a moment profess to speak with "Artilleryman's" authority or experience, and he trusts the foregoing remarks will not be construed as constituting an adverse criticism on his article. But the writer is actuated by so keen a desire for the attainment of all the author advocates, that any point of divergent opinion is the more sharply accentuated.

Most of the views herein advanced do not in fact bear directly upon the article in question—they merely arise out of it. The writer does not wish necessarily to identify himself with the attitude of mind he has endeavoured to represent. But he is satisfied that he has not exaggerated the distracting anomalies which appear inseparable from the attempt to bring a citizen army into line with regular troops, so long as the military defence of this country is dependent upon the gratuitous effort of the individual.

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Winter Manœuvres of Royal Canadian Horse Artillery.

COMMUNICATED.

THE Royal Canadian Horse Artillery was organized into a composite six gun battery, two sections armed with 12-pr. B.L. 6-cwt. guns, and one section with 18-pr. Q.F. guns.

The guns were mounted as follows:—

4 12-pr. B.L. guns on sleigh runners.

1 18-pr. Q.F. gun " "

1 18-pr. Q.F. gun and limber dismounted and placed on a farmer's bob, with the wheels on a farmer's platform sleigh. Operations were carried out in accordance with a General and Special Idea.

15th February:—

Weather.—Clear and cold. At 3 p.m., 10°F., with a fresh easterly breeze. 10 p.m., milder. Snow on the level about 15 inches deep, but much drifted in places.

Operations.—9.45 a.m. Inspection by I.G. 10 a.m., marched off to get a suitable position, the battery had to move about 300 yards down a lane where snow had drifted to a depth of about 3 feet, and then into a field, covered with 15 inches of snow, with many boulders and holes. The guns on sleigh runners acted satisfactorily so far as could be ascertained with drill ammunition only, though a pole was broken by a gun striking a boulder concealed under the snow. Camp reached at 3.30 p.m. Distance 14 miles.

16th February:—

3 a.m. Rain commenced, freezing as it fell, accompanied by a gale from the west. 10.30 a.m. Much colder with a slight northerly breeze. 6 p.m. Temperature 10° F. with a slight N.E. breeze. Reveillé 6.30 a.m. Stables 6.45 a.m. Breakfast 7.30 a.m.

Operations.—9 a.m. Marched off. Watered after half an hour six miles from camp. Came into action with drill ammunition in a light wood 150 yards off the road in 1½ to 2½ feet of snow. The guns on sleigh runners acted well. Camp reached at 1.35 p.m. Distance 11 miles.

17th February:—

Reveillé 6.30 a.m. Stables 6.45 a.m. Breakfast 7.30 a.m.

Weather, 6 p.m.—Commenced to snow, by 9 a.m. a blizzard was blowing with thick though light snow. Thermometer 10° F.

Operations.—The 4 12-pr. B.L. guns fired a series of 37 live

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shells from a concealed position. Practice satisfactory, except that there was a delay in running up, and the shooting not quite so accurate as on bare ground on account of recoil not being so constant. Range 2300 yards.

The 2 18-pr. Q.F. guns then fired 27 rounds live shell (19 effective) after advancing 2500 yards. Both these series were fired on ice, 15 inches to 18 inches thick.

2.30 p.m. started back for camp. 3.45 p.m. reached camp.

18th February:—

Reveillé 6 a.m. Marched off 9 a.m.

Weather.—Ten inches of snow had fallen during the night, which on account of the blizzard had formed large drifts. Thermometer, 6 a.m., 10° F.; 7.30 a.m., 4° F. 9 a.m., bright sunshine and light breeze (N.).

Operations.—The roads had not been broken since the blizzard and were very heavy, while in places the horses were girth deep in snow. The detachments were ordered to the front of all guns, and so assisted in breaking the trail. 12 noon, halt, cold lunch. 1 p.m., march resumed. 4.50 p.m., barracks reached. Distance, 26 miles.

GENERAL REMARKS.

Buffer oil.—18-prs. Q.F. buffers should be emptied as the oil will freeze, and should be filled with the mixture as laid down in "Care of War Material" for garrison mountings subject to frost, viz:—

Methylated spirits	7 gallons.
Distilled water	3¼ „
Carbonate of soda	250 grains.
Mineral oil	¼ gallon.

This mixture was used with the 18-pr. Q.F. guns and acted well.

Poles.—Poles are very liable to snap if a concealed boulder is struck when moving in open fields, and it would be advisable for each sub-section to have two spare poles when setting out on winter manœuvres.

Ammunition.—Both 18-pr. Q.F. and 12-pr. B.L. ammunition acted normally at plus 10° F. after having been subjected to −4° within 24 hours previous to the gun practice on the 17th.

Tents and Bivouac.—Tents were pitched near trees, and the thicker the wood the better for shelter and stability, fir or pine branches were, when practicable, put in thick layers under the waterproof sheets, and these were found to prevent the cold from working through underneath. Four iron pegs were found most useful, and with these four points fast, the tent was made fast with branches and snow. It is most important that a thick layer of branches be placed under the blankets, and if these are not procurable, more blankets should be placed under rather than over, as the most penetrating cold comes from underneath.

Drying fires.—It would be very desirable when time permitted it, every two days if possible, to make large drying fires, where wet socks, horse blankets, &c., might be dried out. Officers and N.C.O's should see to this with great care.

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Bits.—If bits are placed in the horses mouth without being warmed a great deal of suffering will be caused by their sticking to the mouth and lips, and it is essential to warn all mounted men of the necessity of thawing out the bits in front of the fires available before bitting up.

Horses heels.—Before starting out for manœuvres and directly upon arrival in camp, after the heels were dried off, a mixture of mutton fat and sulphur was rubbed into the heels, which proved an effective preventative against cracks.

Ground scouting.—It was found impossible to ground scout in the actual gun practices in the manner laid down in the "F.A.T.," on account of the snow concealing boulders, holes, and stumps, &c. Except when under fire it would, therefore, be most advisable to have the detachments well in front of the guns when advancing for action so as to avoid the danger of a gun capsizing by driving into a hole, or poles being broken on account of the sledge runners striking a concealed boulder, stump, or other obstacle.

The gun platforms also should, when possible, be tramped down by the men on foot before the guns come up so as to ascertain that the platform is fairly level, and that there are no concealed obstacles, for once a gun was unlimbered on an unfavourable platform the consequences might be very serious, and it is impossible to tell anything by eye about the ground when it is covered with snow.

Observation of fire.—Observation of fire was found to be much more difficult than in summer time, as the smoke was not so easily seen against the prevailing whiteness, and for the same reason it was very difficult to distinguish between a "graze" and a low "air."

SUB-APPENDIX "A."

Watering, Feeding, and Clothing of horses on Winter Manœuvres.

Watering.—Even in hard work it was found that horses required very little water, and a certain amount of snow was picked up with the hay.

Horses were watered twice a day only and drank from one to one and a half buckets on each occasion.

They would not drink at all on starting off, so halts for watering were made at the first convenient place after three or four miles had been covered. The second watering was carried out immediately on arrival in camp.

Two pumps with three feet of piping were carried to let down through the ice, but these were not required, as it was found that a man with an axe could make a good water hole in about three minutes, and buckets were dipped in and horses watered from them.

It might be worth noting that as soon as the water is let into the hole it gushes up to the level of the top of the ice, so that as soon as it is seen oozing in, the cutting should be completed to the required dimensions, after which a single blow of the axe will flood the water hole. If the water is let in before the hole is completed a new hole will have to be cut.

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Feeding.—12 pounds of oats and 18 pounds of hay were found to keep the horses fit. The hay could be doubtless reduced, and the oats increased, if on active service it was found impracticable to transport the hay on account of its bulk.

SUB-APPENDIX " B."

COOKING.

Utensils.—Four 10 gallon and fifteen 2½ gallon ordnance store iron kettles of ten gallons capacity were taken from tne cook houses, and these with the ordinary camp kettles were the only vessels used. Iron tripods connected with a rod with "S" hooks completed the camp cooking arrangements.

Organization.—Two cook-houses only were kept going; one for Officers' Mess and one for N.C.O's and men.

The cooking was very satisfactory, but it is very probable that the men would have lived better had section, or even sub-section, cook-houses been established. This, however, was impossible with the number of men available for cook duty, and it seems doubtful whether small sub-section or troop cook-houses would ever be possible, on account of the duties required from mounted branches, and on this occasion dismounted men were kept down to the smallest number possible.

With infantry, however, it would be a simple matter to have a cooking establishment for every twenty or twenty-five men, provided proper arrangements were made for drawing wood, &c. The chief disadvantages of the one large battery cook-house appears to be, that though such things as stews, pork and beans, tea and coffee, &c., are easily made, yet there is no opportunity when cooking for a large number by a couple of cooks to make scones, dampers, and such like things, and though in this case the men got as much hot stew with biscuit and tea or coffee as they could eat or drink, both night and morning, they would have undoubtedly lived better had smaller than battery cooking units been possible, and in the latter case an issue of more flour and less biscuit would have been advisable.

For individual cooking also, an issue of a couple of frying-pans per sub-section for making scones or dampers, would be of benefit to the men.

Rations.—Rations were drawn from the C.P.A.S.C., four days' rations being drawn before marching out.

Bread.—Very little bread was taken, as it froze when exposed to the weather for a short time. The issue of 1½lbs. of bread per man was exchanged for 1lb. of biscuits. These biscuits were made in Kingston and were in good condition at all times; the weather not affecting them. They are similar to the ordinary sea biscuit.

Fresh meat.—Two-thirds of the total quantity was cooked before marching out, which froze solid the first day. It could not then be issued to the men until it was re-cooked. The meat was then cut up and served with vegetables in stew. The raw beef, which mainly consisted of bones, &c., from the above, was made into soup once a day for all ranks.

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Bacon.—The bacon was exchanged for fat pork; this after being boiled at night and served cold with beans, biscuits and coffee, was found to be one of the best meals, and relished most by the men.

Jam.—Part of this ration was taken, the balance being exchanged for onions and other vegetables. Jam is not a very serviceable ration on a march of this nature, and it becomes very hard with the cold, and dirties up the men's mess tins more than the stews or soup.

Potatoes.—The potatoes froze solid when exposed to the weather for a short time, and were used once a day by putting them in cold water a few hours before they were required, in order to take the frost out, and then sliced up and put into the stew or soup.

Tea, Coffee and Sugar.—The regular issue of these was not sufficient, as it was found necessary to have tea and coffee available at all times in camp, and especially during the night, for men on duty. It was found that a double issue fulfilled requirements.

SUB-APPENDIX " C."

Siting of camps.—Camps when practicable should be made in the pine forests on account of shelter, the next best is light wood, and failing that, ground which is protected by natural features from prevailing winds. It was found that where unsheltered by woods, the wind swept down the hollows unless the ground was very steep. As both men and horses drink less than in summer the close proximity of water to the camp appears to be less important, and at Verona, where the water was three-quarters of a mile away, there was no undue loss of time in watering horses, and sufficient water for boiling tea and pork, &c., was quickly brought up on transport or sleighs. It may not follow that water could always be brought up in this way for a large force, but experience showed that to get men and horses into natural shelter was most important.

SUB-APPENDIX " D."

Country.—The country traversed was very rough, there were a number of steep hills with short turns, and in many places there was only just width enough for the gun to pass. The roads in many places were quite blind, and the greatest care had to be taken when passing over the narrow culverts.

The third day out was the worst in this respect, as about eight of the ten miles traversed was through woods and over lakes, along a lumber road which had a number of steep hills.

The roads in general might be summed up as average bad ones, and this might be borne in mind when considering the transport of the guns.

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The Attack of Aeroplanes and Dirigibles.

By MAJOR H. T. HAWKINS, R.A. (retired).

AS the Committee of the R.A. Institution are asking for papers on the attack of aeroplanes and dirigibles, I am giving a few crude ideas that have occurred to me from time to time, in case they should be of value. It seems to me that, although it is impossible at present to make definite pronouncements as to details, it may well be possible to indicate certain lines which the attack of aerial machines from the earth is likely to follow.

Dirigibles:—

To clear the ground we may premise that the scope of dirigibles at present, and in the near future, will include:—

1. Distant reconnaissance—strategical.
2. The bombardment of large areas, such as docks.
3. Close reconnaissance—tactical.
4. The bombardment of small targets, such as a ship's decks, a body of men in close order, &c.

The first two, which may be considered together for the present, could only be undertaken in tolerably fine weather. Unless the hostile aircraft were a negligible quantity they would be surely attempted at night if there were no urgent need of haste.

These operations, leaving the opposing airships out of the question for the moment, must be counteracted by guns mounted on cars such as already described in the "R.A. Journal," and those mounted in the fixed defences of the dockyards or other areas concerned; but it is pretty certain that as airships can carry out these duties when moving fast, and at a great height, it will be by no means easy to hit them with the calibre of gun advocated at present, notwithstanding the large targets they offer. On the other hand, losses of engine power may reduce the lifting power due to their planes, and loss of gas may reduce their buoyancy, so they may at any time be brought down to a height at which they could be easily demolished. In any case, given adequate preparations and a good look-out, there seems no reason to doubt that there would be a very fair chance of destroying these dirigibles; probably as good as the chance of destroying a hostile torpedo boat with a couple of 12-pr. guns. Besides guns, both fixed and mobile, it is suggested that aero-bombs must be provided wherever there is a great inducement for a dirigible to slow down or hover; details of proposed bombs, gun details, ammunition which appears suitable to the attack of the different air vessels, and so on, will be considered later.

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Coming to the closer reconnaissance and bombardment one is reminded that whereas the rigid type of airship is certain to be used for the work considered above, now we have to consider the semi-rigid and non-rigid types of dirigibles, which are transported with comparative ease, but cannot, I believe, ascend to, or remain at, great heights with the certainty of the rigid type. They are also slower, lose shape and pace more easily, and present a smaller target. Both on board ship and in the field there can be no doubt that special guns must be provided for use against these vessels; the ordinary field gun or ship's gun would only have occasional chances of firing on them, owing to their obvious limitations, although field howitzers might certainly carry a few special light H.E. shell with special sensitive fuze which would do for airships and be useful, at a pinch, elsewhere. Their ordinary shell are of course too slow and quite unnecessarily heavy. An adequate armament for the near future would appear to be two guns on motor carriages for a division on land, guns of about 3″ calibre; on the sea, armament at the rate of two guns of 4·7″ or 6″ calibre per battleship. Aerobombs too would certainly be necessary at sea, and probably be useful on land.

We see then that as soon as news was sent round the country that a dirigible was on the war path, news which might well be sent by wireless from a vessel which sighted her before she reached our shores, the mobile guns belonging to divisions would turn out and follow her if she entered their districts, mobile and fixed guns allotted to localities would receive her at their posts, fast cruisers would hunt her over the face of the waters. The best dirigible at present built is extremely vulnerable by storms or shell, and any loss of buoyancy at a distance from her base is a most serious matter. It would be a very great mistake to overdo aerial defence at the present moment. Perhaps four guns of medium calibre in fixed positions and two light automobile guns would be a fair allowance for the average dockyard.

But there is a most serious aspect of the case that I have not seen noticed any where yet, and that is that the tremendous possibilities of damage that exist in the ton or so of high explosive that a dirigible can carry impose the necessity of scattering, and not concentrating, all new docks, stores of explosives, &c. A dirigible, or even an aeroplane, might well make one big *coup* by surprise, but it is morally certain that she will not be able to make a succession of successful shots at comparatively small targets when the country is roused. This is the answer to the point so ably brought forward by Captain Tulloch lately at the Royal United Service Institution, when he affirmed that our whole reserve of cordite could be destroyed at one swoop. In the same way a fleet would certainly open out in the presence of the smallest semi-rigid, or non-rigid, dirigible, and quarter columns would dissolve at the double in the field. Large parks of ordnance, or engineer, stores will be absolutely forbidden in future warfare. This principle ought to be kept carefully in view at the present time, not only when docks and ammunition stores, as mentioned above, are being arranged for, but even in such matters as standing camps, reservoirs, manufactories of chemicals, and so on.

Aeroplanes:—

Now, having cleared the ground somewhat as regards dirigibles,

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we come to the consideration of aeroplanes. The first thing to be pointed out is that the aeroplane will soon be a very serious menace to the dirigible, especially if the latter has lost buoyancy and cannot remain with certainty at a considerable height. Anyone who was at Bournemouth on the 12th and 13th July, as the writer was, saw two most striking instances of the strong and weak points of the aeroplane. Morane's Blériot at a height of 4000 feet looked like a midge; if one took one's glasses off it one had great trouble in picking it up again; and both ascent and descent were made with such precision, and apparent ease and certainty, that one could not help thinking that a dirigible going ten miles an hour slower, and unable to rise as high, would have been absolutely at his mercy. The ease with which he poised over the centre of the ground when at the top of his pitch, gave one an idea of the grim certainty with which he could have placed himself in a position to drop a hand grenade on the envelope of a dirigible beneath him. The other incident, the fatal accident to Rolls, emphasised the instability of the aeroplane of to-day in the strongest way. A slight accident to the tail of the machine when going slow, equivalent perhaps to the loss of a feather or two out of a bird's tail, a sudden dip, and all stability is lost! Until a much larger proportion of the supporting surfaces can be used for stabilising it is manifest that the aeroplane is a fair weather machine only, and in a fresh breeze a dirigible, although perhaps only able to make her course with difficulty, could laugh at the best Blériot pilot.

But the aeroplane must be reckoned with even in its present state for carrying out the two last functions mentioned as in the power of the dirigible, in fine weather, and its pace, small target, and comparative invulnerability to fire, make it fully as difficult to deal with as the other. Of course if anything goes wrong with the engine the pilot must descend at once, and if within an enemy's reach, surrender, but it looks as if this machine would be enormously improved in the near future, and that involuntary descents from that cause will be rare. It is more difficult to hit than a dirigible, but does not at present hold the possibility of doing a tenth of the damage, owing to its small carrying power.

As regards its attack by guns, nothing can be added to the suggestions made above for dirigibles, but it would be almost useless to attempt to get direct hits, and shrapnel or high explosive shell are the only possible mode of attack. Aero bombs would not have so good a chance as with a dirigible, but would bring it down if exploded near enough to seriously affect its stability.

Summary:—

To summarize the situation, one may say that the dirigible is at present the most dangerous, but that it is very vulnerable to gun fire, and to do its work properly it must come within gun range. For casual bombardment, however, it can remain high enough to make it very difficult for guns to hit it, and the only thing to attack it with certainty would be another dirigible, or an aeroplane of more powerful type than any at present available. It can work in a fresh breeze which will help it if in the right direction. It can stop or go dead slow, either as regards the air through which it is moving, or the

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ground beneath it, at any time. A gale would probably wreck it, but failing that it might remain aloft for days.

The aeroplane is less dangerous, much more difficult to see, much more difficult to hit. It cannot remain aloft more than a few hours at its best, and that only in fine weather. This machine is more likely to be improved in the near future than the other, and would then be much more formidable.

Gun attack.—Auto-sights:—

By far the greatest need for efficient gun attack is the provision of an auto-sight. It would smooth away most of the obvious difficulties that confront one when one considers the speed of the target, obstruction of sight by clouds, and the constant variance of the trajectory due to the varying altitude of the target. The difficulties in the way of designing such a sight are great, but the following suggestion is put forward for consideration. Connect the elevating arrangement to a one-man rangefinder, like the Barr & Stroud, have it fitted with a telescopic sight, and in the train of gear connecting them insert a cam, or other differentiating arrangement, pivoted freely and controlled by a pendulum of suitable weight; this differentiating arrangement to provide an alteration of the value of train of gear so as to always give to the gun the elevation due to the trajectory, whatever the altitude of the target. Such an arrangement could not be ideally accurate on a ship, or on a car moving on a road, but it must be remembered that the dirigible is a big target, and that for the aeroplane groups of shrapnel would have a large spread, so extreme accuracy is not essential.

In considering vertical trajectories it looks as if the artillery will have to use the word "altitude" in its strict astronomical sense, not in the popular sense as a synonym for "height." Unless this is done there must be confusion of thought. As it will be necessary to provide for laying by ordinary sights, even if auto-sights should be introduced, range tables giving gun elevations for every 5° of "altitude" up to 85 will be necessary. At 90° the elevation for any range is obviously 0°. "Altitude" of target is, of course, equivalent to elevation of the line of sight above the horizontal plane.

Firehose ranging:—

It is proposed abroad to range on the firehose principle, employing a burning composition in the shell to give it a trail of smoke up the range, and enable the layer or setter to see whether he is short or over. This may do in a clear light, but one cannot but think that it would be almost useless in dull weather, and quite useless at night. Whereas the air-vessel is sure to attack at night or in dull weather as much as possible. Moreover an air-vessel will dodge among the clouds so as to give as little time as possible for an enemy's gun to range on her, and it must be remembered that at each re-appearance not only has the range altered, but probably the trajectory as well, owing to a different altitude of the target. A smoke trail should be arranged for, if possible, as an auxiliary to any method of ranging.

Guns.—Calibres:—

As regards guns for fixed positions, a medium gun like the 4·7″

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would seem most suitable. Rapidity of fire, and a high remaining velocity in the vertical trajectories at altitudes from 45° to 90°, are the *desiderata*. The smallest shell will carry fire as well as the largest, but the advantages of a 4·7″ over, say a 2·5″ shell, are higher velocities, much steadier flight, *i. e.*, less affected by the varying air currents met with aloft, a larger smoke trail, and possibilities in the way of shrapnel bullets and H.E. burster that a small shell cannot have.

For the mobile gun, which should be mounted on a lorry capable of doing at least 25 miles an hour, a calibre of 3″ is perhaps rather more than the designers could give us now, but it should be as near that as possible.

Mountings:—

Mountings must give as much elevation as possible, 90° if it could be managed, it is obvious that directly overhead is the easiest position of the target for the gunner.

Siting:—

Guns defending a dockyard, or other important area, would be sited singly in a circle round it; or as nearly in a circle as circumstances will allow. Diameter of circle perhaps from 2000 yards to 4000 yards. Mobile guns would manœuvre singly.

Ammunition:—

A single special projectile with special T. & P. fuze would appear to suffice for aerial work. Shell to hold a fair number of bullets, but not so many as the ordinary shrapnel, so as to leave room for a relatively large H.E. burster, and a large fuze. This shell would rely on percussion action chiefly against dirigibles, and time action against aeroplanes. The time action of the special fuze would be large, and would provide a smoke trail up to 6000 yards, and then burst the shell in mid air, if not set to act earlier. The percussion arrangement must be sensitive enough to act on striking the gas-bag of a dirigible as the smoke producing time fuze could not be depended on to ignite gas. Every old gunner has seen a time fuze serenely burning itself out in a bucket of water and remembers the underlying principle. If any difficulty should be found in getting a percussion fuze arrangement sensitive enough, the following is suggested as a possible method. Have two steel strips (whiskers) which are normally held down by an inflammable tie in grooves at the nose of the shell, but which are forced out at right angles to the longer axis of the shell as it leaves the bore, by springs, and put the fuze in action. On the shell perforating the envelope these whiskers are forced backwards and set off the fuze.

If the question of possible injury to non-combatants is held to be a serious one, as very possibly might be the case in a country with such ideals as England has just now, it would be necessary to employ H.E. shell. Such a shell shivered into dust in mid air would be harmless. After all it is probably a moot point whether, considering the increased likelihood of an aeroplane's stability being upset, a H.E. shell would not be as effective as shrapnel.

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Methods of fire:—

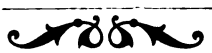
Failing an auto-sight, "setting," as used with anti-torpedo-boat guns before auto-sights were fitted, would no doubt be the best. The setter using field glasses, which must be light as he has only one hand to hold them with. If the smoke trail were easily visible, this method should be effective. If the smoke trail is not visible, and a rangefinder has to be depended on, a setter is still necessary as the range alterations will come very fast, especially against aeroplanes at top speed. In this case too, if the target is approaching, fuzes will have to come down 500 yards or so at a time, as they can now do 50 miles an hour easily.

Aero-bombs:—

Aero-bombs, or aerial torpedoes, are small balloons either free or captive, having the highest possible degree of buoyancy, and carrying a charge of high explosive which can be exploded by a time fuze, if the balloon is free, or by electricity, through wires in its cable, if it is captive. They would be sent up in the path of an airship to disable it by the concussion of their explosion. They might well be carried in wagons in the field if there was a shortage of vertical fire guns with a force.

Preparation:—

It must be borne in mind that, after all, the principle antagonist of an enemy's aerial fleet is our own, and that guns are auxiliaries. The detail of guns sketched out is not necessary at the moment, although the defence of our big dockyards might well be taken in hand now. What is imperatively necessary is thorough-going experiments and the issue of a certain number of experimental guns, so that a number of men may be trained in this new branch of a gunner's duties, and that, with their experiences, improvements may be introduced that will make us well up to date. In about three years time we may have war forced on us at any moment, and on such terms that we cannot afford to give away a single point. Before that time the armaments lightly indicated here should certainly be issued, and all ranks thoroughly trained in their use.



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Effects on Coast Defence of the Naval Developments of the last few years.

By CAPTAIN H. T. HART, R.G.A.

"*Le Temps* reminds us, by the way, that more than two years ago its naval expert predicted what would happen when he expressed the fear that, although England had then a pronounced advance, ships of the Dreadnought class have so considerably lowered the value of their predecessors, that a combination of two fleets superior to the English fleet might follow in the very near future. This prediction is now being realised. The moral of it all is, as I may observe, that England should no longer repose exclusive reliance on her fleet, but should devote more attention to the strength of her army. This is a fact which has long been recognised on the Continent, but which has never seemed to have been duly understood on your side of the water."

Thus writes a foreign correspondent to one of our great daily papers.

But in order to weigh the influence which increasing navies bear upon coast defence, not only the development of ships, but also that of nations must be taken into account.

Before the Russo-Japanese war the balance of power in Europe was maintained by the coalitions known as the Dual and Triple Alliances, with Great Britain and America in isolation. But since the treaty of Portsmouth, fresh treaties and alterations in the relations between Powers have been *en evidence*. The naval strengths of Germany, United States, and Japan, have vastly increased, whilst those of France and Russia have been decadent. The oft-quoted saying that "the frontier of the British Empire is the coast-line of the foe," has been partially realized by the withdrawal of the majority of British capital ships to home waters, and this has been facilitated by the conclusion of the Anglo-Japanese Alliance.

In the diagram, the strategical frontier prior to 1905 is shewn by heavy black lines, and that now taken up is indicated by the shaded portion. The former was practically world-wide, the latter, due to the alliance with Japan, is now nominally constricted to the narrow seas of the Mediterranean, the English Channel and North Sea. It is impossible for the British fleet to be in superior strength everywhere; and, as concentration is one of the first of naval strategical moves, it is essential that this should take place in home waters at the present time.

This has, however, reduced the British naval superiority over other Powers in other portions of the globe, and is unavoidable, unless greater strength than the two power standard is maintained. The effect has been to allow a temporary local superiority, both in peace time and on outbreak of war, to be gained by an enemy. This condition will possibly last for a longer period than was previously possible.

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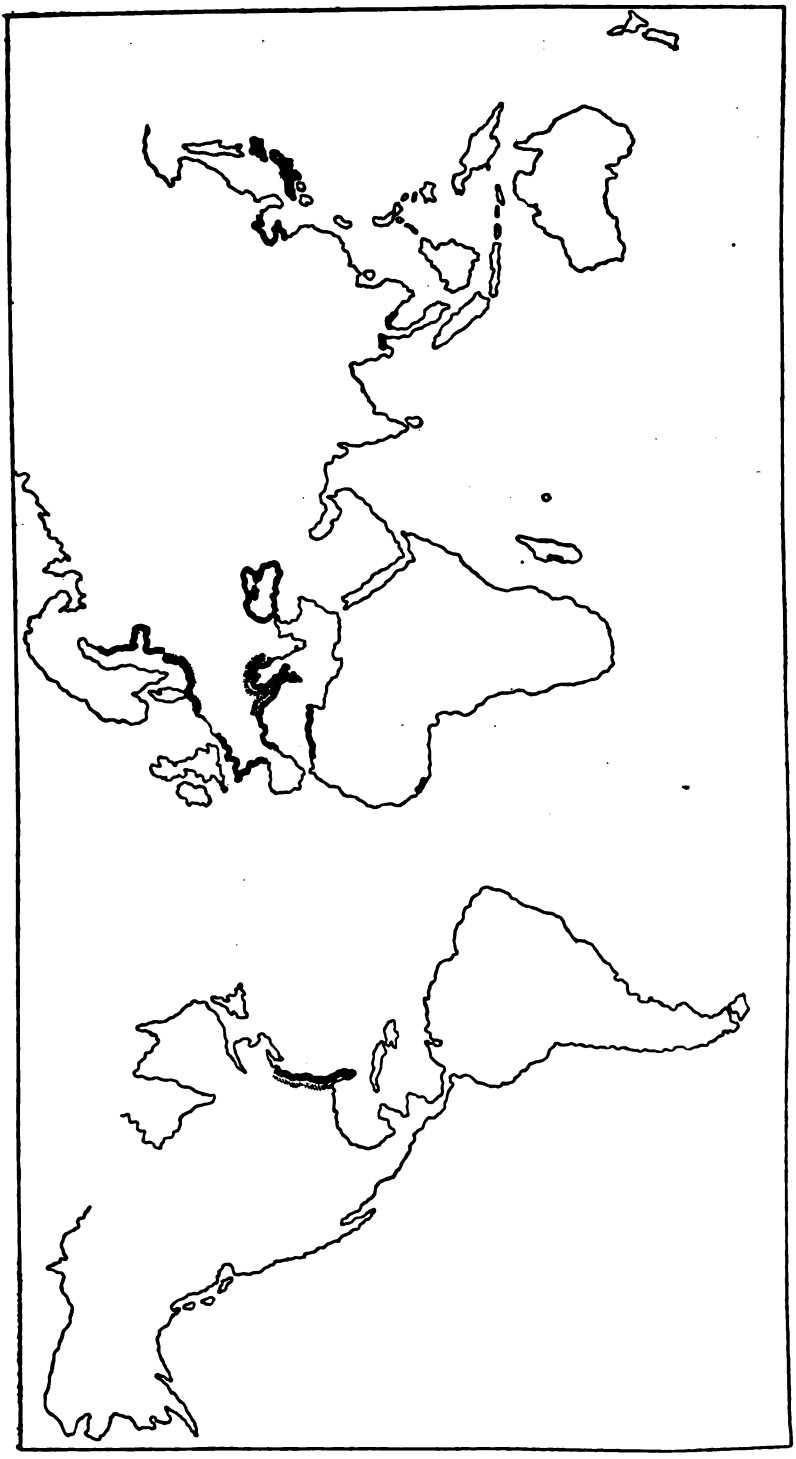

Diagram showing the strategical lines of defence—1905 and 1910.

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The result of these strategical moves, carried out by the Admiralty since 1905, has been, that coast defences distant from the United Kingdom are liable to an attack of longer duration than was formerly expected.

Although, owing to the possible coalitions against us, the scale of attack may not materially have been altered, the necessity for fixed defences at ports has been justified in recent years. The movement of the Russian fleet under Rodjestvensky from the Baltic to the Far East, and the peaceful cruise of the United States fleet round the world, were undertaken under difficult conditions as regards coaling and victualling.

It may, therefore, be concluded that, due to the development of the resources of nations and the consequent growth of their naval power,

(a). The necessity for defended ports is more than ever an important item of imperial defence.

(b). The more distant the defended port from the fleet, the longer is the period during which a defence will have to be maintained.

(c). The concentration of British naval power is due to the strategical conditions prevailing, and this entails the absence of capital ships from many parts of the world previously occupied by them.

The growth of the financial resources of certain nations, and the lessons which were inculcated by the Russo-Japanese war have produced a revolution in ideas, resulting in far-reaching advances in regard to matériel.

The era of the 12-inch B.L. gun started in 1894; and, to combat this, superior armour was necessary. In 1898 the armoured, as against the protected cruiser, was introduced. Following closely on the Russo-Japanese war, the revolutionary type of battleship, now known as the Dreadnought class was commenced. The Dreadnought cruiser still more recently has superseded the armoured cruiser. Heavier ordnance, improved armour, and greater speed has been the cry since 1905. Not only in the case of capital ships has improvement been apparent; torpedo-boat destroyers have grown in size from 300 to 1000 tons displacement; and in 1906 France commenced defending some of these with ·8 inches of armour for "end-on" attack. Submarines, between the years 1903 and 1910 have increased from 100 to 600 tons displacement.

Primary armament has increased from 9·2 inches to 13·5 inches, and even 14-inch guns are being manufactured by at least one nation; secondary armament has been retained by some Powers, but even they have enlarged the calibre from 6 to 8 inches, and the 3-pr. Q.F. has been discarded as an anti-torpedo-boat gun in favour of the 4-inch Q.F. In recent years magazine accommodation to admit of the augmentation of the number of rounds per gun carried has been a feature in construction. Turbines and oil fuel are gradually replacing the old type of coal consuming reciprocating engines. Since 1905 naval gunnery has been more carefully studied, resulting in improved fire effect, which is not merely due to training, but to improvement in adjuncts for fire control.

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2. Larger radius of action and speed.
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A tabulated statement of naval developments since 1905, gives the comparative advance of the fleets of four nations.

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France	4 12″ 50 calibre 12 9·″4 „ „	4 12″ 50 calibre 10 7·6″
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United States	4 10″ 40 calibre 16 6″ 50 calibre	Not building
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TABLE II.

Shipbuilding Programmes, 1905–1910.

		1906-07.	1907-08.	1908-09.	1909-10.
United States	B.	2	2	2	2
	A.C.	—	—	—	—
	P.C.	—	—	—	—
	T.B.D.	—	5	10	—
Germany	B.	2	2	3	3
	A.C.	1	1	1	1
	P.C.	2	2	2	3
	T.B.D.	12	12	12	12
Japan	B.	7*	2	—	—
	A.C.	1*	2	—	—
	P.C.	4*	—	—	—
	T.B.D.	5	5	5	—
France	B.	2	4	—	6
	A.C.	1	—	—	—
	P.C.	—	—	—	—
	T.B.D.	9	5	10	—

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In addition to these, Germany is building a few small fast unarmoured cruisers with protected decks and armed with 4·1″ guns. Two are being built by Japan for her navy.

It will be seen, therefore, that the unarmoured cruiser seems to be obsolescent.

This general improvement in the capabilities of vessels must affect the future of coast defences; and it would appear that the time has arrived for a general review as to whether, in the race for superiority, the advantage does not lie with an opposing fleet.

This question might be argued from the point of view of

(a). Bombardment.

(b). Direct Attack.

Bombardment entails long range firing, and it may be taken for granted that ordnance with ballistics superior to those in the defences will be employed. In other words, any ordnance superior to the 9·2″ B.L. will be used; and this points to attack by guns of 10 inch calibre and upwards which are mounted in battleships and the latest armoured cruisers. In order to gain the full effect of their employment, efficient rangefinding and observation are essential.

Due to the comparatively low site of fire control stations, the range will either be limited or a large target chosen. It is, therefore, doubtful whether an objective smaller than a dockyard will be attacked in this manner. Observation, apart from atmospheric conditions, will only be limited by the curvature of the earth, which, from a control station some 60 feet above waterline, would limit the power of a vessel to a range less than 16,000 yards.

It would be improbable that any efficient practice could be conducted except at a range much inferior to this. With the assistance, however, of a spotting ship, or an observation party on shore, the range could be increased. The necessity for independent observation is apparent from the knowledge that rangefinding instruments with short horizontal bases are at present unreliable.

It has been suggested that bombardment is improbable in view of the enemy's vessels having to meet the relieving fleet with depleted magazines. It is, however, questionable whether this objection can hold good when an attack is made under the conditions of temporary naval superiority mentioned at the beginning of this paper. Again, the short life of large ordnance is considered to be a factor militating against this wasteful form of attack. The life of heavy guns has been much increased of late years by foreign nations, and the supply of reserve guns may be sufficient to replace wastage.

In "open" harbours, where the defending guns are withdrawn from the enemy's objective, coast defences labour under a disadvantage from the commencement; and it would appear that at stations liable to bombardment a gun is required capable of an effective range of at least 18,000 yards to deal with this form of attack. This would admit of 16,000 yards for the range taken up by the spotting ship and 2000 yards to spare, due to the retirement of the guns from the enemy's target. The gun required should be of such a nature as to render damage to 50% of a battleship engaging the defences at this range.

Direct attack may be subdivided into attack by capital ships or

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by smaller natures of vessels. If battleships or armoured cruisers are likely to lose one of their number by attacking the guns of coast defences, the attempt will not readily be undertaken. The improvement, enlargement, and consequent reduction in number of capital ships should render attack by these vessels more unlikely than in former years, since the loss of, or serious damage to, one of these is of more importance under present conditions. Even temporary local superiority would hardly justify this action, because time within which to effect repairs may be limited. Another factor of importance is the employment of local naval flotillas, which are intended to assist the land defences on such occasions. The United States, on the other hand, have still adhered to the use of mines, arguing that the local naval flotilla may be summoned away in augmentation of those in other threatened places. Moreover, in enclosed waters, submarines in the local flotillas can only take the part of indifferent torpedo-boats, owing to the difficulty of navigation when submerged in any but open water. Running past batteries at night into undefended interior waters would, therefore, still appear to be a feasible manœuvre on certain occasions. As submarine mines are no longer used in the land service, it would appear necessary to increase the calibre of guns and man them by day and night in those places where attack of this nature is likely to take place.

Direct attack by unarmoured cruisers would now appear to be a thing of the past. Table II. indicates that this type of vessel is obsolescent, and that if we may expect an attack by cruiser, it will be by a protected cruiser.

The British navy have adopted the 4-inch Q.F. as an anti-torpedo-boat gun on all their ships since the construction of H.M.S. Dreadnought. In power it is equal, and in speed it is superior, to the 4·7″ Q.F.; in fact, it is little inferior to the 12-pr. Q.F. in the latter quality.

Owing to the greater size of the modern boat, increased effect in projectiles is required, especially where the line of attack is parallel to the line of fire of the guns. As the time under which torpedo-boat-destroyers will be under fire will be so short in the case of "open" harbours (where inner defences are impossible), it would appear that a larger gun than the 12-pr. Q.F. is required. The superiority of the 4″ Q.F. shell over that of the 12-pr. Q.F. would justify the slower rate of fire, although the 12-pr. Q.F. still seems to be sufficiently powerful when a boat must run past the battery.

Owing to the tortuous nature of the channels in most of our harbours, submarine attack with submerged hulls is difficult; and a submarine awash should represent little difficulty to anti-torpedo-boat guns. At the same time, if the submarines of the defence can manœuvre submerged round the port, so will it be possible for those of the enemy to do likewise. No land defence would appear to deal with this problem, and again the local naval defence flotilla is required to combat this form of attack.

The general conclusions to be drawn appear to be that, as ships have advanced in power rather than in numerical superiority, so the guns in land defences should improve as a natural corollary. The inauguration of local defence naval flotillas will necessitate closer co-operation and combined manœuvres with the navy, in order that

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Due to the comparatively low site of fire control stations, the range will either be limited or a large target chosen. It is, therefore, doubtful whether an objective smaller than a dockyard will be attacked in this manner. Observation, apart from atmospheric conditions, will only be limited by the curvature of the earth, which, from a control station some 60 feet above waterline, would limit the power of a vessel to a range less than 16,000 yards.

It would be improbable that any efficient practice could be conducted except at a range much inferior to this. With the assistance, however, of a spotting ship, or an observation party on shore, the range could be increased. The necessity for independent observation is apparent from the knowledge that rangefinding instruments with short horizontal bases are at present unreliable.

It has been suggested that bombardment is improbable in view of the enemy's vessels having to meet the relieving fleet with depleted magazines. It is, however, questionable whether this objection can hold good when an attack is made under the conditions of temporary naval superiority mentioned at the beginning of this paper. Again, the short life of large ordnance is considered to be a factor militating against this wasteful form of attack. The life of heavy guns has been much increased of late years by foreign nations, and the supply of reserve guns may be sufficient to replace wastage.

In "open" harbours, where the defending guns are withdrawn from the enemy's objective, coast defences labour under a disadvantage from the commencement; and it would appear that at stations liable to bombardment a gun is required capable of an effective range of at least 18,000 yards to deal with this form of attack. This would admit of 16,000 yards for the range taken up by the spotting ship and 2000 yards to spare, due to the retirement of the guns from the enemy's target. The gun required should be of such a nature as to render damage to 50% of a battleship engaging the defences at this range.

Direct attack may be subdivided into attack by capital ships or

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by smaller natures of vessels. If battleships or armoured cruisers are likely to lose one of their number by attacking the guns of coast defences, the attempt will not readily be undertaken. The improvement, enlargement, and consequent reduction in number of capital ships should render attack by these vessels more unlikely than in former years, since the loss of, or serious damage to, one of these is of more importance under present conditions. Even temporary local superiority would hardly justify this action, because time within which to effect repairs may be limited. Another factor of importance is the employment of local naval flotillas, which are intended to assist the land defences on such occasions. The United States, on the other hand, have still adhered to the use of mines, arguing that the local naval flotilla may be summoned away in augmentation of those in other threatened places. Moreover, in enclosed waters, submarines in the local flotillas can only take the part of indifferent torpedo-boats, owing to the difficulty of navigation when submerged in any but open water. Running past batteries at night into undefended interior waters would, therefore, still appear to be a feasible manœuvre on certain occasions. As submarine mines are no longer used in the land service, it would appear necessary to increase the calibre of guns and man them by day and night in those places where attack of this nature is likely to take place.

Direct attack by unarmoured cruisers would now appear to be a thing of the past. Table II. indicates that this type of vessel is obsolescent, and that if we may expect an attack by cruiser, it will be by a protected cruiser.

The British navy have adopted the 4-inch Q.F. as an anti-torpedo-boat gun on all their ships since the construction of H.M.S. Dreadnought. In power it is equal, and in speed it is superior, to the 4·7″ Q.F.; in fact, it is little inferior to the 12-pr. Q.F. in the latter quality.

Owing to the greater size of the modern boat, increased effect in projectiles is required, especially where the line of attack is parallel to the line of fire of the guns. As the time under which torpedo-boat-destroyers will be under fire will be so short in the case of "open" harbours (where inner defences are impossible), it would appear that a larger gun than the 12-pr. Q.F. is required. The superiority of the 4″ Q.F. shell over that of the 12-pr. Q.F. would justify the slower rate of fire, although the 12-pr. Q.F. still seems to be sufficiently powerful when a boat must run past the battery.

Owing to the tortuous nature of the channels in most of our harbours, submarine attack with submerged hulls is difficult; and a submarine awash should represent little difficulty to anti-torpedo-boat guns. At the same time, if the submarines of the defence can manœuvre submerged round the port, so will it be possible for those of the enemy to do likewise. No land defence would appear to deal with this problem, and again the local naval defence flotilla is required to combat this form of attack.

The general conclusions to be drawn appear to be that, as ships have advanced in power rather than in numerical superiority, so the guns in land defences should improve as a natural corollary. The inauguration of local defence naval flotillas will necessitate closer co-operation and combined manœuvres with the navy, in order that

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the difficulties to be overcome by the combination of two different forces might be demonstrated and worked out in detail.

Due to the strategical disposition of the British fleet under present conditions, coast fortresses which have no squadrons based in their vicinity, have an enhanced value and require more powerful armament than has hitherto been deemed necessary.

Quality, rather than quantity, seems to be the main problem. The value of a gun mounted in coast defences as compared with that of similar calibre in a ship, can only be approximately arrived at by determining the ratio of probable hits at fighting ranges, on gun and vessel respectively. Nothing less than a direct hit on a gun mounted in an open work may be considered to render it *hors de combat*, whereas every projectile penetrating the side of a ship will have some effect on its fighting value.

Given the same nature of gun mounted in the defences as that mounted in the enemy's vessels, numerical superiority of the latter's ordnance appears to be of minor importance.

With the augmentation of foreign navies, the world wide disposition and local superiority of the British fleet is gradually becoming a condition of the past. Gradually the strength of the fleets of other nations is advancing and the proportionate superiority of the British fleet is diminishing.

Security of bases for navies is as important as that for armies; and, as the relative strength of navies approach to terms of equality, so should the increase of strength in coast defences attain a more prominent place in the problem of national defence.

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Notes on the War in the Peninsula, 1808-10.

Including the "Giron" diaries. Edited by Major J. Arzadun, Spanish Artillery.

By MAJOR GENERAL J. C. DALTON, R.A. (retd.).

(With Map).

INTRODUCTION.

THESE notes are a continuation of those published by the "Journal of the United Service Institution" in 1909, and taken by me from the periodical articles which have appeared in the Monday issues of the Spanish newspaper *El Imparcial*. They were collated from the original MS. diaries of General D. Pedro Augustin Giron, and edited by Major D. Juan Arzadun of the Spanish Artillery, who, fortunately, became entrusted with these interesting documents which only saw light for the first time some 100 years after the events they chronicle.

The extracts which I gave to the "Journal of the Royal United Service Institution" commenced with a short personal notice of General Giron, and then carried us through that important time before the battle of Bailen (19th July, 1808), when the Junta at Seville directed the conduct of the war and all preparations for equipping and training the troops which, under command of General Castaños, gained the decisive victory of Bailen.

The diaries dealt with that famous battle and the skirmishes and minor activities which preceded it, and described the memorable capitulation of Bailen when, in the words of Giron, "Eight thousand, "two hundred and forty-two splendid French troops . . . . came to "lay down their arms at the feet of a Spanish army formed in 20 "days." This was only a portion of the force which surrendered. Vedel's entire division, which had not been in the fight, also laid down its arms; and the total number of survivors out of a force of about 23,000 men, some 17,600, were made prisoners.[1]

Giron describes the victorious entry of Castaños into Seville and his departure for Madrid on 15th August, 1808, and gives an epitome of the good service rendered by the Junta at Seville before it lost its independence and had to become subordinate to the Central Junta at Aranjuez. The articles published in the "Journal of the Royal United Service Institution" concluded with a summary by Giron of the fruits of the battle of Bailen.

In order to make the notes and comments by the editor on the

[1] A brief account of the battle of Bailen was published by me in the "Journal of the Royal Artillery," Vol. XXXV., No. 12, but the student of this battle should read Oman's "Peninsular War."—*J.C.D.*

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matter contained in the diaries of General Giron more consecutive and easier to follow, I have interpolated a brief précis of the events of that period for the benefit of the reader, in the form of a narrative.

Though I have occasionally quoted from Napier, my information is mainly derived from Oman's "History of the Peninsular War," which is by far the best and most impartial history of this campaign. Professor Oman has so carefully investigated every controversial point—and there are many of them—both by a deep study, often on the ground itself, of all the writings and statements of eye-witnesses and historians, that no one can get a proper insight into this great campaign without having his work to refer to. The editor of the diaries, Major Arzadun, has evidently read Oman's history in conjunction with other authorities and often quotes from it in his interesting abstract of the Giron diaries of which I hope to reproduce the greater part in this series of articles.

In September, 1808, the French, according to Napier, had over 90,000 men under arms in the Peninsula of whom 40,000 went to garrison fortresses and secure the communications, and 50,000 fighting troops were available between Bilbao on the Bay of Biscay, and Alfaro on the Ebro.

The Spaniards divided their force into three armies, right, centre and left, estimated at 75,400 in the first line, and 57,000 in the second. This, according to Napier, was a "monstrous exaggeration" of the real facts, and he places the total force at 76,000 ill equipped and badly found troops. The right was under General Palafox (of Zaragoza fame), who took the zone from Zaragoza to Sanguesa on the Aragon river; the centre, under Castaños, occupied Borja, Taranzona and Agreda; the left was under Blake at Reynosa near the sources of the Ebro.[1]

As Giron in his diaries does not deal with the situation at this time it is sufficient here to say that the French had the advantage in practically every way. Blake gained a trifling success in occupying Bilbao, but a rapid movement of Ney forced him to retreat to Valmaceda. The Spanish General O'Neill had also a slight success on the right near Sanguesa, and Castaños proceeded towards Tudela (on the Ebro at the junction of the roads to Zaragoza and Taranzona). A temporary reinforcement for the Spanish forces had joined on October 9th, when the Marquis of Romana's division, some 8000 strong, which had escaped from the Low Countries, disembarked at Santander, having been equipped at the expense of England. The Spaniards at this time relied on British assistance, but Sir David Baird's Corps was delayed in Coruña, and Sir John Moore's force got no help—all due to the incompetence of the Central Junta, which failed to avail itself of the enthusiasm and co-operation of the Spanish nation, and neglected the troops to such an extent as to breed discontent, and worse than that, in the army, leading men to desert whenever they got a chance.

But the French, though more than a match for the Spanish armies, were by no means immune from mistakes. Napier freely criticizes the Generals on both sides. "If genius was asleep with the French, it was dead with the Spaniards."

[1] Napier's "Peninsular War," Book III.

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The Central Junta took on itself the direction of operations, and would not entrust Castaños with the supreme command.

Castaños arrived at Tudela on 17th October, 1808, and on the 20th conferred with General Palafox at Zaragoza. Together they could only dispose of some 45,000 troops divided into the armies of the Centre and of Aragon. Their position was critical, but they decided on offensive operations which ended disastrously, due to weak generalship, divided counsels, and the bad behaviour of the troops. Castaños and Palafox fell out and matters were brought to a crisis by the interference of D. Francisco Palafox, brother of the General, a member of the Junta, who had been sent to Head quarters with a sort of dormant commission to enquire into the state of affairs. This authority he grossly abused.

It would take far too long to follow the complicated events of the next month. It will suffice now to say that Blake was defeated in the north and had to retreat. Napoleon arrived at Vittoria, and the presence of a master mind soon made itself felt. Soult captured Burgos whither the Emperor moved; and Marshals Lannes and Ney were directed against Castaños. Soult utterly defeated the flower of the Spanish army under Count Belvedere at Gamonal on 10th November, 1808; Blake's line of retreat was intercepted at Espinosa where his force was routed on 11th November by Marshal Victor, and driven into the Asturias Mountains on November 13th.

D. Francisco Palafox, to whom I have already alluded, assumed an authority, which was quite unwarranted, during the illness of Castaños, and which was for the time being fatal to the Spanish cause.

Oman in his "Peninsular War" carefully investigates the various orders and counter-orders of this unhappy period, and quotes from the diaries of Sir Charles Vaughan and Colonel Graham, who were attached to the Staffs of Joseph Palafox, and Castaños, respectively. I am now merely endeavouring to bring in the main current of incidents so as to make the remarks of General Giron (which are somewhat meagre at this particular epoch) understandable.

Francisco Palafox managed by his arrogance and stupidity to bring about the separation, by the river Ebro, of the halves of the Spanish force, so that either half could be assailed by the enemy in superior force.

Castaños, though virtually deposed, continued in command, but he and General Palafox could not agree on a plan of operations, and the absence of a responsible head caused endless complications. Every action of those concerned with the leading of the Spanish troops conspired to rob them of any chance of success they might have had. Castaños required the support of the army of Aragon, which lay across the Ebro, and applied to General O'Neill to join him, but the latter refused to do so without the approval of his immediate chief, General Palafox, and thus precious time was wasted.

The unfortunate Castaños had only half of his position on the Tudela heights occupied on November 22nd, when Marshal Lannes was reported near at hand, and on the following day, swooping down with some 35,000 men and 60 guns, Lannes made short work of the disorganised host opposed to him, and dispersed them in all directions

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with a loss to the Spaniards in killed, wounded and prisoners of 8000 to 9000 men.[1]

Castaños retreated, pursued by Marshal Ney, and managed by superhuman efforts to get the scattered, and now mutinous, remnant of his force to Cuenca. He was ordered to report himself to the Central Junta and had to hand over his command to General La Peña.

Events followed rapidly. Napier relates how Napoleon resolved to force the Somosierra and reach Madrid before Castaños could get there. General San Juan (later on murdered by his own soldiers), who held an apparently impregnable position at Somosierra, was on 1st December, 1808, driven out of it by a master-stroke devised by Napoleon himself, aided greatly by the bad conduct of the defenders. Madrid was in a state of anarchy and, on December 4th, opened its gates to Napoleon, chiefly owing to the treachery of D. Tomas Morla and the Prince of Castelfranco.

The Giron manuscripts do not touch on the events in Portugal during the unfortunate period dating from October, 1808, up to the arrival of Sir Arthur Wellesley on April 22nd, 1809, to take up the supreme command.

This period, as is well known, culminated in Moore's advance into Spain, Napoleon's pursuit, and the frustration of his schemes on 31st December, when Moore cleverly escaped. Napoleon had already left Madrid, in disgust, and handed over the conduct of the chase to Soult, who arrived before Coruña only to see the British force safely embarked for England, and to suffer a moral defeat at the hands of the gallant Moore, who had accomplished his self-sacrificing purpose at the expense of his precious life on 16th January, 1809.

Meanwhile the wrecks of the Spanish Army were gradually recovering from the disasters of Tudela and were being reorganised at Cuenca under the Duke del Infantado reinforced by the brigade of the Count de Alacha. General Venegas was placed in command of the vanguard and cavalry, and while meditating an advance on Madrid was badly routed at Uclés by Marshal Victor on 13th January, 1809. Infantado retreated on Murcia, and King Joseph entered Madrid in state on January 22nd, Napoleon having left Spain five days earlier after laying down careful directions for the future conduct of the campaign.

The remnants of the defeated Spanish armies were once again collected and rallied by order of the Central Junta, and were disposed generally as follows:—

The Extremaduran Army, some 15,000 men in a bad state of discipline, was placed under command of General Cuesta.

The Marques de Palacio's division at La Carolina, augmented by the remains of Infantado's Army, was placed under General Cartaojal and given the name of the "Army of the Centre."

General Joseph Palafox, who had been reinforced, was still holding out bravely at Zaragoza, besieged since December 20th by Marshals Mortier and Junot (who succeeded Moncey) with 25,000 men. He had in all some 32,000 regulars and 10,000 irregulars. The heroic defence of Zaragoza is a matter of history, and it is not necessary now to say more than that after two months of desperate

[1] Napier, Book IV. Chapter I. Oman, Sec. VII. Chapter V.

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fighting, the courageous and patriotic defenders succumbed on 24th February, 1809, to the persistent attacks of the enemy led by Marshal Lannes, who had returned from France to conduct the siege, and the worn out garrison surrendered on honourable terms.

The Army of Catalonia consisted about that time of some 4000 men, including irregulars.

As regards the campaign in Catalonia it will suffice here to mention that the French, under the command of St. Cyr, captured the fortress of Rosas on December 5th, 1808, after a notable defence in which British bluejackets and marines bore a conspicuous part under Lord Cochrane. He then marched on Barcelona and relieved it, defeated Reding at Molino del Rey on December 21st, and again at Vallo on 25th February, 1809, where the gallant Reding (one of the heroes of Bailen) fell mortally wounded.

Soult succeeded in capturing Oporto from the Portuguese on 29th March, 1809, and allowed his troops to wreak an awful vengeance on that unhappy town.

Two days, however, before Oporto fell the Spanish "Army of the Centre," under Cartaojal (some 12,000 men and 20 guns) had marched to attack Marshal Sebastiani and suffered a severe defeat at Ciudad Real, losing all their guns, besides 1000 killed and many prisoners.

Next day Cuesta with the Army of Extremadura had to submit to an even worse *débacle* at Medellin at the hands of Marshal Victor.

Fortunately for the Spanish nation, Sir A. Wellesley now arrived on the scene, having landed at Lisbon on April 22nd, 1809, on appointment to the command of the British and Portuguese forces, and, for a time at least, matters were to improve.

The first task which the famous British leader set himself was to make his plans for recovering the lost ground in Portugal, and to retake Oporto, where the victorious Soult was very insecurely established, having had to detach a considerable part of his force on various expeditions.

Wellesley having detached a force of British and Portuguese troops to Abrantes in order to keep Marshal Victor in check, advanced with all the remaining force of the Allies at his disposal against Soult.[1]

The famous and daring passage of the River Douro by Hill's brigade, the occupation of the Seminary on the opposite bank, the subsequent repulse of the surprised French in their desperate endeavours to turn out the British, and their hurried retreat are well known matters of history.

On May 12th, 1809, the British were in possession of Oporto and Soult's army was in full retreat, abandoning guns, baggage, and all impedimenta. Wellesley started in pursuit on May 14th, but Soult, after great hardships in crossing the Galician Mountains, reached Orense on 19th May, with sadly reduced numbers, badly disorganized. Wellesley gave up the pursuit and ordered a concentration at Abrantes on the river Tagus.

On May 22nd, 1809, Wellesley wrote to Cuesta from Oporto to try and arrive at some plan for co-operation against the common enemy, and informed him that the British force would be concentrated

[1] Oman estimates the combined British and Portuguese force at about 18,000 men.

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at Abrantes early in June. Colonel Mayne with a small Portuguese force was at Alcantara in order to observe the movements of Marshal Victor. The French commander had for some time been shewing a masterly inactivity in Extremadura, and had his three divisions concentrated round about Merida watching the Guadiana and keeping an eye on Cuesta. Hearing of Mayne's force at the Bridge of Alcantara he attacked it on 14th May and drove off Mayne with some loss, but did not hold the place, and withdrew to Caceres. The Portuguese returned and completed the destruction of the bridge. This fact, added to the difficulty of provisioning in Extremadura, the news of the reinforcement of Cuesta's army, and the evacuation of Portugal by Soult, induced Victor to fall back to the line of the Tagus, and about 19th June Victor had taken up a defensive position with his right on Almaraz and left on Talavera.

Wellesley's force, owing to lack of clothing and supplies, the exhaustion of his troops and a disorganized and worn out transport, did not get to Abrantes till about 15th June, and whilst awaiting reinforcements from England he was occupied in organizing his command. Thus he remained at Abrantes till June 28th, and by July 9th was in Plasencia, having successfully kept his movements secret from the enemy.

Meanwhile, Victor's 12,000 men had been starved out of their position on the Tagus, and on June 26th took up a position behind the river Alberche, having destroyed the bridge at Almaraz.

Sebastiani was at Madridejos with 20,000 men, and King Joseph had some 12,000 in a central position in readiness as a reserve.

Wellesley's plan was that General Venegas[1] should deal with Sebastiani, whilst he and Cuesta combined should meet Victor. He did not anticipate any trouble from Soult, whose troops could not have recovered from the hardships of their retreat from Portugal, and he proposed to detach a force to watch Mortier who was thought to be near Avila.

Owing to difficulties with Cuesta this plan fell through, but Venegas was given elaborate instructions for the part he was to play, viz., to advance from St. Cruz de Mudela against Sebastiani and thus separate him from Victor and King Joseph. He would also threaten Madrid, and should be at Fuentedueñas by July 23rd.

Again, however, Wellesley's well matured plans were to be frustrated. Ney unexpectedly abandoned Galicia, where he had been expected to remain, and marched on Astorga. His approach enabled Soult to move on Plasencia, and Mortier was also on his way to join Victor. Thus the communications of the Allies became seriously threatened by some 50,000 of the enemy. Wellesley had planned for an advance on July 18th, but the collection of supplies and transport animals presented great difficulties and caused him no little anxiety.

On July 20th his and Cuesta's forces effected a junction at Oropesa, and next day moved on Talavera, where the cavalry on both sides came into contact, and after some skirmishes the French retired to a strong position across the Alberche. Wellesley wished to attack this position on the 23rd, but owing to the dilatoriness of his Spanish colleague, he had to abandon the idea of fighting on that

[1] Venegas commanded the army of La Mancha, about 23,000 strong including many recruits.

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day; and next morning when the Allies moved forward they found the French had moved off. The annoyance felt by the British commander found a vent in an angry correspondence with General Cuesta, who in a spirit of obstinacy took matters into his own hands and followed up Victor independently of his ally.

On arrival at Torrijos, 15 miles from Toledo, Cuesta found that Sebastiani and the reserve of King Joseph had reinforced Victor, bringing up the total strength of the French to 50,000 men. Venegas had disobeyed Cuesta's orders and had signally failed in keeping Sebastiani in check. Thus the plans of the Allied Generals had been wrecked "partly by the sloth of Venegas, partly by Cuesta's inexplicable and perverse refusal to fight on July 23rd, upon the line of the Alberche." [1]

We left Cuesta at Torrijos whither the French army advanced on July 28th, eager not to lose such an opportunity of dealing with the enemy in detail. Cuesta, seeing his danger, commenced to retreat, and, protected by a strong rearguard, reached the Alberche safely where he was met by Wellesley who advised him to recross the river. Pursuing the same foolish obstinacy which always led him to go directly counter to the suggestions of his colleague, he remained in position with the river in his rear. Fortunately for Cuesta the French were strangely inactive, and he got safely across the next morning.

On July 27th the armies got into position and "first blood" was drawn by the French in the affair of Casa de Salinas, where part of Sherbrooke's division was surprised when withdrawing to their new position, losing 440 men.

The dispositions for the desperate struggle that was about to begin, are clearly described by Oman. The Spanish force occupied a strong position on the right protected by the river Tagus on their right flank, and holding Talavera and the outskirts to the north, their left being protected by a low hill on which was a redoubt armed with guns.[2] The English force came next and had to bear the brunt of the attack, the strong point in the line of defence being the hill called the Cerro de Medellin which formed the left of the English line. Some cavalry, English and Spanish, and, later in the day, some Spanish infantry occupied the left (and northern) end of the position.

Of Marshal Victor's army, Sebastiani's, Lapisse's and Laval's divisions were concentrated opposite the British.

The British strength was 20,000; the Spaniards numbered 32,000, and the French about 46,000.

A desperate night attack by Ruffin, directed at the Cerro de Medellin failed, and next morning the battle was resumed with renewed fury and lasted till dusk, when the French retired off the field. The victory was dearly bought; over 5000 Allies and 7000 French were placed *hors de combat.* The Spanish force with the exception of those on the left of the line were practically not engaged, but such as were rendered a good account of themselves, especially the cavalry regiment "del Rey" which behaved most gallantly. The Spanish artillery also afforded valuable help; it was of heavier calibre than the British and was well served.

[1] Oman, Vol. III. p. 493. The editor of the Giron diaries, as will be seen later defends Venegas to some extent.—*J.C.D.*

[2] Lawson's brigade of 3 pounders.

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The Allies did not follow up their victory; exhaustion, want of supplies, and a feeling of insecurity on the left flank owing to the possibility of an attack on the British communications with Portugal by Soult and Ney, whose whereabouts were uncertain, decided Wellesley to retire westwards across the Tagus. Eventually, on August 12th, he was south of the Tagus near Arzobispo and ready to march to Abrantes should the French threaten Portugal.

On August 20th Wellesley retired in the direction of Badajoz.

Cuesta relinquished the command of the Spanish force on August 15th owing to age and ill-health, and was succeeded by General Eguia.

Meanwhile King Joseph was bent on meeting and defeating General Venegas who was at Aranjuez. The latter, though ordered on August 4th by his superior, Cuesta, to withdraw if threatened, deliberately disregarded this order, and when the French forces were concentrated at Toledo on August 8th and advanced against him, he withdrew to a position at Almonacid, on a hill called the Cerro del Castillo. Sebastiani attacked this hill and captured it, and as the Spaniards were changing position, King Joseph's reserves came up and completed the rout of Venegas' army.

After this victory the French troops rested on their laurels. Oman gives us concisely the dispositions of the French and their opponents at the end of August, 1809:—

> "Soult was left at Plasencia, Mortier at Talavera and Naval Moral, Ney at "Salamanca, Victor's headquarters were at Daimiel in La Mancha, Sebastiani "lay along the Tagus from Aranjuez to Toledo. Of the Allied troops, Wellesley's "army was cantoned about Badajoz and Merida. The Extremadurans under "Eguia covered the passage of the Tagus from Deleytosa, Jaraicejo and Trux-"illo: Venegas was reorganizing his depleted Corps at his old quarters in the "passes by La Carolina. Beresford was observing Soult from Castillo Branco, "and, lastly, the Galicians were moving down by divisions to join Del Parque's "forces at Ciudad Rodrigo, where a formidable army was now beginning to be "collected."[1]

The Giron diaries contain nothing of importance after August, 1809, until the following October, when active operations were again resumed, neither do they touch the events of 1809 in eastern Spain which involved the conquest of Aragon by Marshal Suchet, and the defeat of the Spanish General Blake; the siege and capture of Monjuich and Gerona by Verdier after an heroic defence in each case, on August 11th and December 11th, 1809, respectively.

Wellington having gained experience at the time of Talavera of the difficulties of co-operation with independent Spanish generals, over whom he had no authority; and also cognizant of the mode of procedure adopted by the Central Junta—or governing body for Spain—resolutely declined all invitations to join up again with the Spanish armies, and prosecute operations against the invaders. Unless placed in supreme command of the Allies he preferred to remain independent.

The Central Junta, therefore, resolved to make a demonstration on its own account, and drew up plans for an advance on Madrid by the reorganized armies of La Mancha and Extremadura, under Venegas and Eguia—some 50,000 in all—and a new "Army of the Left"

[1] Oman, Vol. II., p. 618.

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was formed, under the Duke del Parque, from the old army of Galicia (Blake's), and from other sources.[1]

Wellington refused to join in a proposed combined advance of the three armies (some 110,000 men). General Areyizaga was given the command in place of Venegas, who was deposed by the Junta.

In October, 1809, operations began; the French under Marchand suffered a reverse at Tamames on 18th October at the hands of the Spanish "Army of the Left." But Kellermann now appeared on the scene, on November 1st, and Del Parque who was at Salamanca retired to Bejar in face of superior numbers.

Areyizaga with the Army of La Mancha started on his advance against the French on November 3rd at a very rapid rate, and appeared in the vicinity of Aranjuez entirely surprising King Joseph and Soult, who were kept badly informed of the movements of this force.

The French disputed the Spanish advance at Ocaña, but retired to Aranjuez on November 11th and arranged a concentration of their forces.

After several delays and much indecision Areyizaga found himself forced to face an army of some 34,000 French, under Soult, before Ocaña on November 19th, 1809, and suffered a disastrous defeat. Giron was hotly engaged in this action. On November 29th Del Parque was beaten at Alba de Tormes by Kellermann.

The result of these disasters was the conquest of Andalusia (except Cadiz) by the French in February, 1810.

Wellington who had never budged from the decision he had arrived at not to co-operate in these operations of the Spanish forces under the unsatisfactory conditions then obtaining, had moved his army into Portugal in January, 1810, and was soon to prepare the famous lines of Torres Vedras, against which the new "Army of Portugal" sent by Napoleon to drive the English out of Spain and Portugal, was to batter itself unavailingly.

As the series of the Giron diaries we are now dealing with ends at Ocaña, this seems a fitting point at which to conclude this already too lengthy introduction.—J. C. D.

The "Giron" Diaries.

Edited by Major Don Juan Arzadun.

PART I.

From Tudela to Uclés.—The return of Castaños.—Cartaojal and Alburquerque.—Giron's book of Orders.—Panic in La Carolina.—A stirring harangue.

The notes alluded to in the first instalment of these diaries concluded with victory[2]; these we are now giving start with discouragement, incompetence, and consequent disaster.

[1] Oman estimates this army at 50,000 men scattered over North-West Spain whence they had to be collected.—Vol III., p. 72.

[2] Bailen.

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The Allies did not follow up their victory; exhaustion, want of supplies, and a feeling of insecurity on the left flank owing to the possibility of an attack on the British communications with Portugal by Soult and Ney, whose whereabouts were uncertain, decided Wellesley to retire westwards across the Tagus. Eventually, on August 12th, he was south of the Tagus near Arzobispo and ready to march to Abrantes should the French threaten Portugal.

On August 20th Wellesley retired in the direction of Badajoz.

Cuesta relinquished the command of the Spanish force on August 15th owing to age and ill-health, and was succeeded by General Eguia.

Meanwhile King Joseph was bent on meeting and defeating General Venegas who was at Aranjuez. The latter, though ordered on August 4th by his superior, Cuesta, to withdraw if threatened, deliberately disregarded this order, and when the French forces were concentrated at Toledo on August 8th and advanced against him, he withdrew to a position at Almonacid, on a hill called the Cerro del Castillo. Sebastiani attacked this hill and captured it, and as the Spaniards were changing position, King Joseph's reserves came up and completed the rout of Venegas' army.

After this victory the French troops rested on their laurels. Oman gives us concisely the dispositions of the French and their opponents at the end of August, 1809:—

> "Soult was left at Plasencia, Mortier at Talavera and Naval Moral, Ney at "Salamanca, Victor's headquarters were at Daimiel in La Mancha, Sebastiani "lay along the Tagus from Aranjuez to Toledo. Of the Allied troops, Wellesley's "army was cantoned about Badajoz and Merida. The Extremadurans under "Eguia covered the passage of the Tagus from Deleytosa, Jaraicejo and Trux-"illo: Venegas was reorganizing his depleted Corps at his old quarters in the "passes by La Carolina. Beresford was observing Soult from Castillo Branco, "and, lastly, the Galicians were moving down by divisions to join Del Parque's "forces at Ciudad Rodrigo, where a formidable army was now beginning to be "collected."[1]

The Giron diaries contain nothing of importance after August, 1809, until the following October, when active operations were again resumed, neither do they touch the events of 1809 in eastern Spain which involved the conquest of Aragon by Marshal Suchet, and the defeat of the Spanish General Blake; the siege and capture of Monjuich and Gerona by Verdier after an heroic defence in each case, on August 11th and December 11th, 1809, respectively.

Wellington having gained experience at the time of Talavera of the difficulties of co-operation with independent Spanish generals, over whom he had no authority; and also cognizant of the mode of procedure adopted by the Central Junta—or governing body for Spain—resolutely declined all invitations to join up again with the Spanish armies, and prosecute operations against the invaders. Unless placed in supreme command of the Allies he preferred to remain independent.

The Central Junta, therefore, resolved to make a demonstration on its own account, and drew up plans for an advance on Madrid by the reorganized armies of La Mancha and Extremadura, under Venegas and Eguia—some 50,000 in all—and a new "Army of the Left"

[1] Oman, Vol. II., p. 618.

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was formed, under the Duke del Parque, from the old army of Galicia (Blake's), and from other sources.[1]

Wellington refused to join in a proposed combined advance of the three armies (some 110,000 men). General Areyizaga was given the command in place of Venegas, who was deposed by the Junta.

In October, 1809, operations began; the French under Marchand suffered a reverse at Tamames on 18th October at the hands of the Spanish "Army of the Left." But Kellermann now appeared on the scene, on November 1st, and Del Parque who was at Salamanca retired to Bejar in face of superior numbers.

Areyizaga with the Army of La Mancha started on his advance against the French on November 3rd at a very rapid rate, and appeared in the vicinity of Aranjuez entirely surprising King Joseph and Soult, who were kept badly informed of the movements of this force.

The French disputed the Spanish advance at Ocaña, but retired to Aranjuez on November 11th and arranged a concentration of their forces.

After several delays and much indecision Areyizaga found himself forced to face an army of some 34,000 French, under Soult, before Ocaña on November 19th, 1809, and suffered a disastrous defeat. Giron was hotly engaged in this action. On November 29th Del Parque was beaten at Alba de Tormes by Kellermann.

The result of these disasters was the conquest of Andalusia (except Cadiz) by the French in February, 1810.

Wellington who had never budged from the decision he had arrived at not to co-operate in these operations of the Spanish forces under the unsatisfactory conditions then obtaining, had moved his army into Portugal in January, 1810, and was soon to prepare the famous lines of Torres Vedras, against which the new "Army of Portugal" sent by Napoleon to drive the English out of Spain and Portugal, was to batter itself unavailingly.

As the series of the Giron diaries we are now dealing with ends at Ocaña, this seems a fitting point at which to conclude this already too lengthy introduction.—J. C. D.

The "Giron" Diaries.

Edited by Major Don Juan Arzadun.

PART I.

From Tudela to Uclés.—The return of Castaños.—Cartaojal and Alburquerque.—Giron's book of Orders.—Panic in La Carolina.—A stirring harangue.

The notes alluded to in the first instalment of these diaries concluded with victory[2]; these we are now giving start with discouragement, incompetence, and consequent disaster.

[1] Oman estimates this army at 50,000 men scattered over North-West Spain whence they had to be collected.—Vol III., p. 72.

[2] Bailen.

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Castaños on arriving at the Court of Madrid with La Peña's division of 7000 men, August 23rd, 1808, writes in a gloomy strain, "Saddened at the knowledge that there are about 3000 men who "cannot quit their barracks from being actually unclothed, not count- "ing in this number those who, accoutred in rags, carry on all the "work." This treatment of the soldiers in the face of the enthusiasm in the country which was prodigal of its hitherto unmutilated resources, was plain proof of the incapacity of the newly born "Central Junta"[1] which wasted in profitless discussion the precious moments which it ought to have devoted to preparations against the formidable attacks which any day might bring forth.

Unfortunately Giron has not set forth in his diaries any of his impressions of this particular time, otherwise he would have mentioned, no doubt, the bitter feelings of the conquerer of Bailen at witnessing the disorder resulting from the want of unity in the command, due as much to the jealousies of the Generals as to the anxiety of the Junta to seize every kind of authority.

Giron, had he continued his diary at this eventful time might have related how Castaños when retracing his steps over the route of his recent triumphal march, deposed from his high position, and with death in his soul, had actually to charge with the thirty men of his escort at Miguelturra amongst the confused crowd made mutinous by the calumnies of deserters; and suffered the further humiliation of having to appeal for relief against so much injustice to the Central Junta.

The diaries when they are resumed lead us to the Spanish army defeated at Tudela, the wrecks of which were collected under the shelter of the Sierras in Cuenca, where they augmented their reduced numbers with recruits and stragglers. There they were joined unexpectedly by the brave division commanded by the Count of Alacha, which had been saved by prodigies of energy, and, having been cheered by the news of the return of Napoleon to France, the Duke of Infantado decided on that mad venture which had for its object the relief of Madrid, a fatal illusion and the origin of all those military disasters commencing with the ephemeral success at Tarancon and terminating soon after at the crowning catastrophe of Uclés, 13th January, 1809.[2]

Giron tells us nothing of those fateful days, but a report of Venegas describes Giron's heroic conduct in the battle of Uclés, where, notwithstanding his prodigious exertions, his command being destroyed, and his horse wounded in two places, he cut his way out through the enemy with a handful of horsemen who preferred death to surrender.

With the remnants of such tremendous wrecks, the national energy shortly built up two armies; that of the Count of Cartaojal in the Sierra Morena, made up of the relics of the forces of the Duke of Infantado and the recruits of Marquis Palacio's; and the army organized by the veteran Cuesta.

[1] Sometimes called the "Junta General" or "Supreme Junta."—*J.C.D.*

[2] General Venegas, who more by good luck than by good generalship found himself in possession of Tarancon, owing to Marshal Victor having withdrawn his outposts, abandoned that place on 10 January and took up a position at Uclés where he was badly beaten by General Ruffin on the 13th. The only part of his army which escaped was saved by General Giron.—*J.C.D.*

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Leaving for a moment the beaten track of history, let us endeavour to scrutinize the state of mind of these divisions which are being laboriously licked into shape in the rugged Sierra, the bastion of Andalusia. To do so we cannot do better than study a book of daily orders issued by Giron, who was in charge of the third division, quartered in Solana; this division together with the fifth, commanded by Brig.-General D. Luis Bassecourt, in Manzanares, the sixth, under Colonel D. Miguel de los Rios in Membrilla, and all the cavalry regiments of España, Pavia, Sagunto, Principe and Bourbon, a brigade of Royal Carabineers, Dragoons from Granada, and Volunteers from Seville and Madrid, constituted the force destined by Cartaojal to be under the immediate command of the Duke of Alburquerque.

Alburquerque was a courageous leader who, disdaining the security which the rocky heights offered, longed, notwithstanding the reluctance of his chief, to get into touch with the enemy, in order by means of frequent successful skirmishes to raise the damaged *morale* of the shaken battalions.

As an example of what demoralization to troops means, one can quote a fact which took place in La Carolina at that time, when a *feu de joie* to celebrate an anniversary caused a panic amongst the recruits though no fighting was taking place.

The army had just been augmented by the arrival of an expeditionary force from an audacious excursion into La Mancha realized by Alburquerque with 9000 infantry and 2000 cavalry, when he surprised at Mora on 18th February, 1809, Digeon's brigade of Dragoons and thereby alarmed Marshal Sebastiani, against whose forces Alburquerque maintained at Consuegra one of those fights which he judged valuable for raising the spirit of his troops. But fearful lest a forced retirement should unnerve his troops he addressed to them a characteristic and strange harangue which Giron has preserved in his book of orders:—

Soldiers,

Your valour, calmness and good order, a sure presage of the victory with which you covered yourselves with glory on the 22nd of February on the field of Consuegra, has so impressed the enemy that it is plain to me that your firmness surprised him, and although he kept his ground he lost the action.

Divine Providence permitted our loss to be very small as you know, whilst that of the enemy exceeds 1500 men and as many horses, either killed or wounded.

All this you are aware of because you saw it for yourselves as I did, but you do not know the advantages which the action has produced, nor the object we had in view when we sallied out of the town in search of the enemy. Know then that the enemy had intended to attack, in full strength, the Army of Extremadura, and by the rapidity with which we moved on Mora we attracted his attention, and have thereby diverted a large portion of the force which was to be directed against that province, thus enabling the army there to receive the assistance it was awaiting.

You have the satisfaction of having gained this interesting point with little loss to yourselves and not an inconsiderable one to the

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enemy, and although we were attacked at Consuegra by 12,000 infantry and 5000 cavalry, which numbers they were concealing, do not doubt that taking the full advantage which the ground afforded me, between the wood, where I hid the infantry, and the defile of the Sierras of Villa-Rubia, on the Fuente Fresno road, I should have awaited the enemy and forced him to come and seek me in that position, had I not received actually on the field an order from the General in Chief not to get involved in any action and to retire from this canton, because my force was wanted elsewhere and had already fulfilled the object it had in hand. As subordination is the chief quality and foundation of military discipline and one I shall always be the first to shew an example of, I took immediate measures, after having well chastised the enemy, to effect our retirement in the manner which you have seen; and in such a way that the enemy did not venture to follow us, notwithstanding his superior forces.

Finally, soldiers, your valour and subordination to your honoured chiefs will make you ever invincible over the armies of the tyrannical enemy, for if with double your strength they respect you, you may rely that with equal, or, still more so, with inferior force, we shall beat them; and our beloved country will owe her salvation to you.

(signed). Alburquerque.

Manzanares, 1st March, 1809.

Reading between the lines, how plainly we see the brave leader champing his bit under the restraining orders of a chief who was over circumspect from his point of view. One could not depict more forcibly the *coralling*, as it were, of the soldiers for the fight. They understood from this inflammatory harangue, the fruit they had gathered in the fatiguing march, the damage done to, and respect engendered in the enemy. The retreat itself instead of being a confession of inferiority became an example of discipline; obedience, not fear, enforced it. By such means is the *morale* of the soldier cultivated.

The cautious Commander-in-Chief could not, however, countenance a second such obstruction of his authority, and Cartaojal despatched Alburquerque "as a reinforcement" to General Cuesta, under whom he served without any diminution of his mettle in the sanguinary *débacle* of Medellin (29th March, 1809).

The remarkable sequel was that, in the end, the prudent General caught the contagion from the rash one, and when removed at last from the protection afforded by the defiles of the Sierra through the action of the Central Junta, he got carried away by the ardour of his soldiers and by the murmurs of an impatient populace, as well as by an inconceivable and all prevailing optimism, and finished up on 27th March, 1809, by handing over to the sabres of the enemy's cavalry, on the open plains of Ciudad Real, and without even a struggle, that mob of recruits and fugitives which all insisted in calling an Army!

(To be continued).

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Effects on Coast Defence of the Naval Developments of the last few years.

By "REHABILITATE."

"FIXED defences are provided for the ports which have been selected as naval bases or coaling stations for the navy, and for other ports, the assurance of whose security is desirable either on account of their strategic value for the protection of trade, or by reason of their commercial importance."

"The forms of attack to which defended ports are liable may be summarised as follows:—

(a). Attack from the sea, which might take the form of—
  (i). Bombardment by battleships and cruisers.
  (ii). Raiding attack by torpedo-boats, destroyers, cruisers, and vessels for use as blockers and boom smashers.
  (iii). Reconnaissance attack.

(b). Raiding attack from the land side."

The two quotations from "Garrison Artillery Training" are given above, the first to define the Coast Defences with which this article deals; the second to formulate the possible forms of attack. The forms which concern the article will be alluded to as "Bombardment" and "Raid," (a) (i) and (a) (ii), reconnaissance attack being considered as a less or more serious case of either of the others according to its nature and the extent to which it is pushed.

Except for some minor details and for the more complete training of the personnel, Coast Defence has been stationary for some years past; and the naval developments, which amount almost to a revolution in the attack, have all taken place since the successive introduction of the D.R.F., the P.F., the anti-T.B. armament and the B.L. 9·2″ on the Mk. V. carriage placed the defence in its present position of excellence.

Before this period of naval activity—in the eyes, at least, of the Garrison gunner—the disparity of defence over attack was quite overwhelming: so much was this the case that our experts considered that Coast Defences required only 9·2″ guns to cope with those of 12″ and larger calibres which were carried in the main armaments of the ships. The systems of fire-control and distribution, the methods of range-finding and transmission, the skilled construction of the emplacements and magazines, the careful organisation and training, the stable platforms and well-placed lights; all contributed to give the defence complete confidence in their ability to deal with any

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of the variants of naval attack with a minimum of discomfort to themselves. The general feeling was that the weapons were fully equal to their task.

The naval developments it is intended to discuss are all matters of common knowledge, and have been described and commented on in the Press. British ships are quoted as types, for foreign naval activity has followed very closely on our heels.

A.

The revolution in the design of battleships has brought in on successive waves, the "Dreadnought," the "St. Vincent," and the "Orion." The defences have now pitted against them larger ships and heavier guns, the armament per ship is greater than before and it is now so disposed as to allow of a larger proportion of it being brought to bear in the desired direction. More ammunition is carried, and by the introduction of suitable rangefinders and methods of fire direction and control, the guns can be fought at long ranges with precision and accuracy comparable, though hardly equal, to that attainable by the use of the P.F. In addition, these ships have greater speed and manœuvring power, their armour is so disposed as to render them less vulnerable than the older types, and facilities are provided in them for rapidly making good disabilities that would arise from the flooding of a compartment. In short, the battleship of to-day is a very much more formidable antagonist than our defences were originally planned to withstand.

B.

Cruisers have also advanced in design. The first class armoured cruiser possesses the advantages of the new battleship with but small modifications: she is more vulnerable and her armament is not so heavy, but her speed and manœuvring power are greater.

C.

The new ocean going destroyers are fitted with turbine engines; they have greater speed and manœuvring power than the older types: their armaments are greater and their vulnerability is less; they move with less noise and vibration, and consequently with less discomfort to those on board.

D.

The practical perfection and universal fitting of "wireless" enables closer control and direction to be exercised by an officer in charge of an evolution and apprises him instantly of its progress: he is also able to summon reinforcements, and to receive warning of the approach of naval aid for the defence.

E.

The practical submarine increases the difficulty of defence against raid, and compels the defence to call upon the navy to defend themselves in this respect.

F.

The fighting efficiency of the cruisers and battleships of older design has been increased by the introduction of better gun sights,

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methods of laying, rangefinding, fire direction and control, which bring them more into line with later ships.

G.

Mines are now controlled by the Navy. This takes one burden from the shoulders of the defence, and it is only logical that these dangerous obstructions should be in the hands of those who have to use the water-way.

H.

The re-distribution of our own fleets and naval activity outside our control are the factors which most seriously affect the defence, but these subjects need freer comment than can be given to them within the limits of this article.

J.

Airships and aeroplanes are hardly as yet within practical range, but they loom very large in the immediate future. The Defence will welcome the time when they can be used for reconnaissance, and perhaps also for offensive purposes. In the attack they should not prove so formidable, as they would already have encountered the vicissitudes and fatigue of a journey before they could commence offensive operations. It has elsewhere been suggested that their attack will be easily checkmated by the erection of light steel nettings at suitable heights above vital points.

From the above considerations it is clear that the handicap under which the attack laboured has now been reduced; but it is a matter of extreme difficulty to place a definite value on the amount of the reduction. It is believed that naval experts, who should be among the most competent to form an opinion, think that the Coast Defences are still more than strong enough for all practical purposes; while the officers responsible for the defence are in no way dismayed at the alteration of the handicap, and are prepared to give a very good account of themselves.

BOMBARDMENT.

Ulterior considerations (H, above) almost absorb the discussion of this form of attack. The very general opinion seems to be that no attacking force will sacrifice ships of superior fighting efficiency and the necessary amount of valuable ammunition, on the reduction of coast forts, even should the enemy possess the temporary command of the sea. That is the forecast: but it is possible, though perhaps improbable, that a situation might arise from which the issue would hang on the reduction or integrity of a fortress.

In such a case, the attacking force could be expanded to any extent, while the resources of the defence would be confined practically to the guns in position. The attack would, of course, be well acquainted with the locations of all the vital points of the defence, and modern facilities would enable them to pick up their targets with astonishing accuracy. The strength of the defence lies in their stable platforms, their sufficient cover and in the smallness and confused aspect of the targets they would present at the range of a

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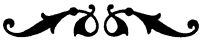
bombardment. The value of this last factor could easily be increased at the expense of but little beyond ingenuity.

Should the handicap be still further reduced, or should circumstances arise in the future to bring the possibility of bombardment within the range of practical politics, the balance can be restored by bringing the calibre of the defence guns into line with those of the attack, and by providing means to reinforce the former by heavy guns on suitable railway mountings, to be run into position over extensions of existing railways, and defended by spade work. For this, an efficient design of mounting and adjustable sight have yet to be devised; they will doubtless be forthcoming when required.

RAID.

There is no doubt that this, the most likely form of attack, will now be more formidable than heretofore. But all contingencies should be easily met by the 4″ anti-T.B. guns, the increased efficiency of the gun detachments achieved by systematic training and the more comprehensive and practical systems of intelligence at present in vogue.

To sum up—the moral to be drawn is that the defence must more than ever keep in touch with naval developments and naval methods both at home and abroad; that home and foreign naval estimates and dispositions in the near future will affect the plans of the defence more than any other factors; and that, for the present at least, the Coast Defences are in a position to do all that may be expected of them, though perhaps not all that they might wish to be able to do.



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REGIMENTAL EXERCISES.

By COLONEL J. T. JOHNSTON, R.A.

IT is not always fully recognised that special training is required to enable officers to produce the best results in carrying out Regimental Exercises.

General Haking's excellent book on Staff Rides and Regimental Tours supplied a much felt want, and cannot be too highly recommended to those who have to direct these exercises.

The object of these notes is to briefly put before such officers, who may not have read General Haking's book, the result of my own experience in this sort of work, with a view to helping them to frame schemes and work them out. They will at any rate learn from them where they can get fuller information.

It will be generally admitted that all training exercises should be with a view to preparation for war. They should be framed, therefore, with a view to reproducing, as nearly as possible, conditions that are likely to occur in war, and should be carried out so as to develop the qualities required of officers in war.

It will be as well to decide first what these qualities are, and then consider how they can be acquired by paper schemes in spite of peace limitations.

In framing the regulations for examinations for promotion, the authorities have shown by the nature of the tests, what qualities they consider necessary.

It will be seen that the Field subjects for promotion may be broadly divided into Tactics, Reconnaissance, and Administration.

The qualities required for the two latter, which are more essentially the work of staff officers, and only required in an elementary form from Regimental officers, are good powers of observation, common sense, method, and clearness of expression.

Tactics require the qualities of a "leader of men." Not quite so easy to define, and perhaps open to a difference of opinion.

Judging from what is required from candidates for promotion, the authorities consider them to be:—

1. An eye for ground.
2. Sound judgment.
3. Rapid decision in forming a plan.
4. Executive power of command.
5. Determination to carry out the plan.

This conclusion is arrived at because the regulations require the tests to be carried out in the Field, which entails an eye for ground.

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Each candidate has to furnish,

(a) An appreciation, which is a test of judgment.

(b) A plan (to be framed within a given space of time), a test of rapid decision.

(c) A set of orders, a test of executive command.

Determination in carrying out a plan has to be tested in the field either by operations with Troops, as in Part II. "Tactical Fitness," or orally by situations given to candidates on the ground by the boards of examinations of Captains and Subalterns.

An officer directing tactical exercises will do well to follow the system of requiring an appreciation, a plan, and written orders for each situation in a tactical problem.

The former may often be given verbally when working out the problem on the ground. The two latter should be always written. Otherwise, during the discussion, officers have a tendency to modify their plan and orders, and much of the value of the discussion is lost. In any case it is essential that all orders, even those that might be given verbally in the field, should be committed to paper, in the form in which they would be issued in war. So that officers may acquire facility and accuracy in issuing orders.

In granting money to carry out regimental exercises, the authorities have recognised the supreme importance of "ground" on all military operations. The money is allotted to units to enable them to carry out training on ground unfamiliar to those taking part in the exercises. Every effort should, therefore, be directed towards getting full value out of the time spent on the ground, as great a variety of ground should be studied as funds will admit, and only such work should be carried out on the ground as cannot be carried out as well, if not better, indoors.

The keenness of regimental officers in such work, when well organised and carried out, leaves nothing to be desired. Where failure to obtain the best results has been noticeable, it has usually been due to the following causes.

1. An unreal scheme, or one unsuited to those engaged in it, or to the ground on which it was carried out.
2. An indefinite or unsuitable task.
3. A want of experience in officers in directing and criticising work.

The scheme:—

Few things are more difficult to produce than a good scheme. Few things easier to criticise. A short scheme is not necessarily clear. The man who has to work out a scheme should be in possession of all the essential information he would actually have in war. It is difficult to condense this into a short space, but with practice it can be done. At any rate all unnecessary information can and must be excluded. Every word in a scheme should have a good reason for its presence there.

The proof of a clear scheme is, that the majority of those working at it should find it unnecessary to make any assumptions, or definitions, or ask any questions. There are usually one or two men who ask unnecessary questions.

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The following are the requisites for a useful scheme for a regimental tour.

1. It must resemble some operation likely to occur in war.
2. It must involve a definite problem, requiring a definite solution, and capable of being tested on the ground.
3. It must be suited to the ground and the scope of the exercise.

As regards the first, all schemes require some imagination, but people cannot be expected to take an interest in such as are hardly conceivable in war.

A scheme was once brought to me based on an invasion of this country by a force of an Infantry brigade, some guns and some cyclists, which had passed through one of our principal coast fortresses, and disembarked some distance up an inlet, without loss to itself or damage to the fortress. It is not to be expected that officers will take a problem seriously based on a general idea of this sort. To avoid improbabilities it is always advisable to get some friend who will not be afraid to say what he really thinks, to read over the scheme and point out anything that requires explanation.

As regards the 2nd and 3rd, the ground is of paramount importance. The director, therefore, must before framing the scheme have thoroughly studied the ground, and its bearing on the problem. He will then be in a position to bring out the soundness or otherwise of the appreciations, plans and orders, by working out on the ground what would be the probable result in war, if opposition were experienced.

The following steps are recommended before starting to frame a scheme.

1. Decide on the distance it is possible to go with the funds available.
2. Decide on the nature of the operations to be studied, that is attack, or defence, advance or rear guards, outposts, &c.
3. Re-read "Training and Manœuvre Regulations," and the instructions in the Training manuals of the different arms on the particular operations selected, and become thoroughly familiar with the guiding principles.
4. Then proceed to some likely ground with the officer who is going to assist in directing, and see if it lends itself to the purpose.

The ground is often likely to be disappointing, as maps cannot give an idea of the extent that houses and trees interfere with the view. But it is often quite unnecessary to go long distances for suitable ground. It is curious how much more ground has been studied by some units at the end of a winter's training than others. In some cases, it almost looked as if officers spent two or three nights away from their stations with a view to getting rid of their training grant as quickly as possible. Some officers at Woolwich did not seem to be aware of the excellent ground available for regimental tours in the valley of the Darent.

Having found suitable ground, the size of the force to be employed is the next point to be settled. There is a tendency to employ unnecessarily large forces. It would help officers working for pro-

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motion, if forces approximately the size laid down for promotions for various ranks were more often used. It would also give commanding officers practice in setting problems for the examinations for Captains and Subalterns. These problems are by no means always clear, and are sometimes unnecessarily difficult.

The size of the force having been settled, the general and special ideas have to be framed.

In regimental exercises, the size of the forces employed involves the action of detachments. Some reasonable pretext must be found for the action of these detachments, for every detachment is a departure from the fundamental principal of strategy, " To concentrate superior force at the decisive point at the right moment."

Detachments at the opening of a campaign are more especially unsound, as they offer opportunities to an opponent for an initial success that may wreck the whole campaign. Later on in a campaign detachments usually become inevitable. General Haking's advice to avoid the opening phases of a campaign cannot be too strongly urged.

The commencement of a campaign, too, involves large strategical problems, naval and political issues that cannot usefully be studied on the ground.

I remember a scheme drawn up by an able officer, in which the boundary of two adjoining counties became the frontier of two nations, and the strategy of the 1866 campaign between Austria and Prussia was illustrated on a reduced scale.

It became very unreal owing to the difficulties on a reduced scale of time and space, lines of communication, bases, &c., and resulted on the ground in a discussion on strategy, which could have been quite as usefully carried out in barracks.

The period of history set for promotion, or some general idea from the previous year's manœuvres, or divisional training, will often suggest a reasonable basis for a regimental exercise.

Alterations to the map, such as abolishing the North Sea, the Straits of Dover, and so on, may get over some of the difficulty in applying past campaigns to our insular conditions, but they create many unrealities. The overpowering influences of London, the existence of various fortresses and their garrisons, the net work of railways, &c., are sources of possible misunderstanding; their effect on the problem must be clearly defined, and there must be no doubt what resources are available, what influence other troops in the area have on the problem, what reinforcements may be expected.

The main thing to aim at in framing a scheme is that its solution shall necessitate a decision, as to a definite course of action. It must not lend itself to masterly inactivity, which is almost invariably a cloak for indecision.

Setting tasks:—

Having framed the scheme, the nature of the tasks to be set has to be decided on. These will depend on the nature of the instruction to be given, the time available on the ground and the method of discussing the work on the ground. To get the fullest value out of the ground, every officer should be fully occupied and interested during the whole time on the ground. This is not possible if a variety of tasks have been set, and if the whole party follow the Director round

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while each officer's work is being discussed, because officers do not keep up interest in the discussion of a problem they have not studied. If then a variety of individual tasks have been set, the Director should arrange, while discussing the work on the ground with each individual, for the other officers to be engaged in some other work.

Setting tasks requires much practice. It is difficult at first to judge how much can be done in a given time, or how much ground can be covered. This will vary according to the nature of the information required, the means of getting over the ground, and the state of the ground. Allowances must be made for all these factors. An area to be reconnoitred looks very small on a map, and may have been covered by a Director in a short time in a motor. It seems very large to the subaltern on a bicycle or on foot on a wet muddy day in a hilly country. Let the task at any rate be definite. Let the instructions be typed or clearly written out in the form of an order. "Capt. A. will, &c., . . . ". with a view to, &c. The work will be handed in, &c. Maps or enlargements may or may not be used, &c." So that there may be no doubt as to the nature of the work. These instructions must be attached to the work when sent in and remain attached.

The object in setting the task must be clearly kept in view. Is it intended to give the officer practice in making a sketch, or in training his observation, or powers of organisation?

If the former, make it clear what instruments are to be used and that it must be done without maps. If the latter, that maps may be used or enlargements made before starting. If training in observation is required, say for what purpose the reconnaissance is ordered, and mention any particular points on which information is especially required.

For instance, if a road reconnaissance is called for, it is essential for the reconnoitring officer to know with what object the task has been set, whether the move is to be opposed or not, what troops, and how many are to use the road, whether it is for a single march, by day or by night, or for continuous use or not, &c.

Nothing leads to more useless waste of time than an indefinite task. It results in mere laborious piling up of text book detail and eye wash sketches. Not that sketches are always useless, they can often save much time and make a report clear, but only when relevant to the information called for. In war, if an officer is sent to reconnoitre, he is sent with some definite object in view. In peace, he should be made to understand this.

Again, let the work set be such as may be required of regimental officers of the rank they hold, or of that for which they are qualifying, and let it have a distinct bearing on the scheme that is being set, and let the information called for be useful to the officer working out the scheme. Do not set work for the mere object of giving officers something to do, and do not set tasks that cannot be thoroughly tested and discussed on the ground. Such tasks only dishearten officers and give them a distaste for paper work.

Testing work:—

Perhaps the most difficult part for the directing officer in conduct-

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ing a regimental exercise is testing the work on the ground and criticising.

In war, all our work has to stand the test of being opposed by an enemy. It has already been suggested that the solutions are best tested by working out on the ground, what would be the probable result in war, if opposition were experienced. This is much more satisfactory and convincing than a mere written expression of opinion on the work; but requires practice.

It can be done by assuming that the troops have reached certain positions on the ground in accordance with the orders issued by the officers working out the scheme. Information will then be given of the enemy's dispositions; thereby producing a fresh situation, neces sitating fresh dispositions and orders from those taking part in the scheme. If the original orders were good, they will meet the new situation successfully, if difficulties arise, their causes can usually be traced to defects in the original work.

The fresh dispositions and orders can be discussed on the ground and further situations given, until the problem has been thoroughly threshed out. In this way the soundness of the work will be tested, and after a little practice, the Director will be able to bring home to officers mistakes that have been made, and suggest what is a sound course of action. General Haking's book explains the system more fully.

Criticism:—

As regards criticism.

As long as it is borne in mind that the object of criticism is to bring out what would be sound in war, and as long as directing officers remember that officers have almost invariably tried to do their best, there is very little to be said about the matter, or reason to suppose that harm will be done by criticism. Criticism is not mere fault finding. The good points as well as the bad should be brought out, but in both cases the reasons for approval or disapproval should be given, and when possible, the probable result in war mentioned.

Indefinite praise and blame is of no value. A man is not likely to learn much from the remark "a very good scheme" or "poor work." Whereas if he is told that it is concise, clear, well reasoned, to the point, or otherwise, and if omissions and irrelevancies are mentioned, he has something to work on next time.

It is not sound to hold up a man to derision or be sarcastic, or to condemn a man's views unheard. If he makes what appears to the director a bad mistake, he should be asked to explain. He may have misunderstood what was required. Very few officers act without some reason. The scheme may not have been clear, the task set indefinite. His explanation may help to make the next scheme more successful.

In discussing work on the ground where several officers, or groups of officers have worked out the same problem, officers will express their views more freely, if the juniors are first called on to explain their ideas, and then those next senior to them in rotation, in this way interest is kept up, and the Director when summing up will usually be able to give good reasons for his own solution of the

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problem. There is often a tendency in regimental exercises for the Director to avoid expressing an opinion on a sound course of action. The German training regulations lay it down as his distinct duty to do so, and it seems only right that he should do so.

Most of these notes are made with a view to helping directing officers. A few words in conclusion to those working out schemes. Seeing how difficult it is to frame a good scheme, officers who receive it should not be too captious about the wording of it. They should at any rate read it through very carefully and think it over before asking what may prove unnecessary questions, or making gratuitous assumptions.

Treat the problem as a real incident in war, and make a practical effort to act exactly as if troops were being handled in the field. Do not treat the matter as if marks were being made for an examination.

Before starting out on reconnaissance or organisation problems, make certain what is the exact information or work required. Give this information, or show these dispositions briefly, clearly and concisely.

Omit nothing that is to the point, add nothing that is unnecessary with the object of showing how clever or hardworking you are. Make no abbreviations that save you trouble if they are likely to cause doubt in the mind of the officer who has to receive the work. Commanding officers in war are working at high pressure. They must be saved all unnecessary labour.

No originality is claimed for these notes, most officers, who have had similar experience, will probably accept these views. Though originally written before the publication of General Haking's book, the similarity of ideas is due to our having been trained together, and having worked together afterwards.

The notes seem in accordance with the "Training and Manœuvre Regulations" recently published, which have limited the scope of these exercises on the lines suggested above.

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Method of finding "Tau," without the use of Bashforth's Table of Tenuity.

By BT.-MAJOR E. H. E. COLLEN, D.S.O., R.G.A.

Assume, as the easiest case: Corrected barometer = 30·00″.
Mean thermometer = 60°

(a). Divide corrected barometer by 3 = 1000*
(b). Add 90 and corrected barometer to nearest inch = 120

1120

(c). Subtract twice thermometer = 120

1000

or "Tau" = 1 (moving back 3 places of decimals).

An even quicker method is as follows:—

If *(b)* is greater than *(c)* add difference of *(b)* and *(c)* to *(a)*.
If *(b)* is less than *(c)* subtract difference of *(b)* and *(c)* from *(a)*.

For example, assume corrected barometer = 29·334. Mean Thermometer = 58°.

Then *(a)* = 977, *(b)* = 119, *(c)* = 116. ∴ Tau = 977 + (diff. of 119 & 116)
= 977 + 3 = ·98.

Again, assume corrected barometer = 29·334. Mean thermometer = 68°.

Then *(a)* = 977, *(b)* = 119, *(c)* = 136. ∴ Tau = 977 − (diff. of *(b)* & *(c)*)
= 977 − 17 = ·96.

The accuracy of the above has been practically tested, and in every case it is correct to two places of decimals. It is not claimed that this method is always quicker than that by the use of Bashforth's Table, but with a little practice, "Tau" can be worked out in one's head, and it is useful to know another and simple method.

* Moving 2 places of decimals.

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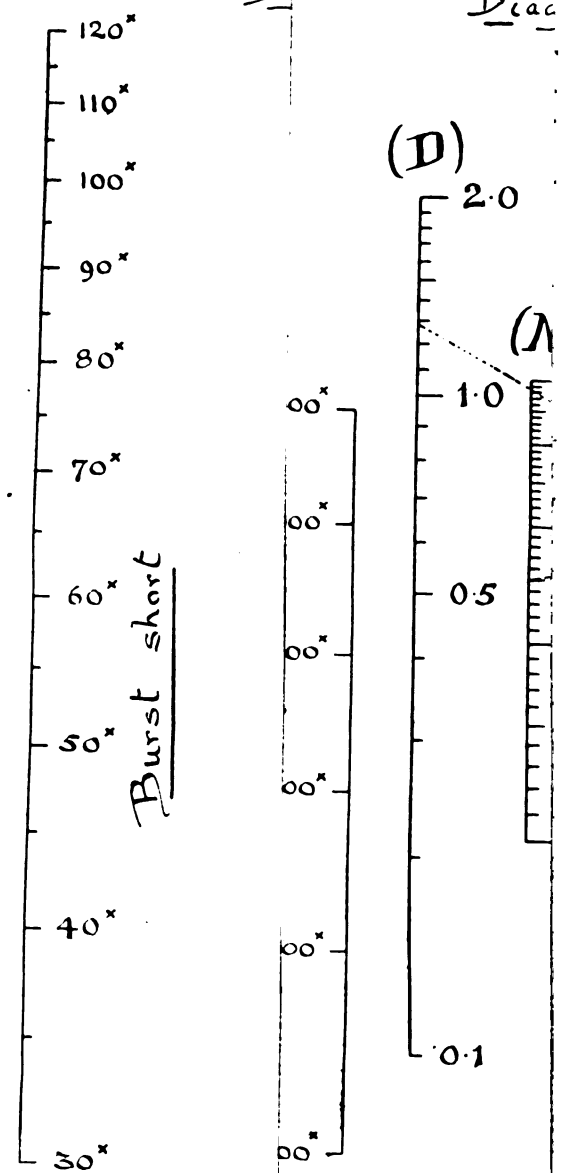

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SHRAPNEL FIRE.

By CAPTAIN R. K. HEZLET, R.F.A.

THE subject indicated by the title "Shrapnel Fire," is a very comprehensive one and it is only proposed in the present paper to deal with what may be regarded as on aspect of the question. *i. e.*, the effect from the point of view of the distribution of the bullets on the target of the regulation of the point of burst.

Apart from the conclusions arrived at, the diagrams A, B, C, D, will be found useful in any consideration of this regulation, as they show at a glance the effect of altering the angle of opening, number of bullets, etc.

When a shrapnel shell is burst "in air," owing mainly to the combined effect of the forward velocity of the shell and its velocity of rotation, the bullets are projected forward so that their paths form a cone known as the "cone of dispersion," and the angle made by the paths of the outermost bullets is the "angle of opening" of the shell.

In reality, owing to the drop of the bullets, the cone is a bent one, but the curvature is so slight at such distances from the point of burst as we are going to deal with, that we may take the axis of the cone as a straight line without serious error.

If we now take a cross section of this cone at right angles to the axis, at any distance from the point of burst, we obtain a circle on which the bullets are distributed according to, to use the analogous term employed with shot guns, the "pattern" given by the shell. This pattern will depend to a great extent on the internal arrangements of the shell; but we may, for purposes of calculation, consider the average *bullet density* of this pattern, i.e., the number of bullets per square yard on the circle, which we may term the *bullet circle*. Knowing the total number of bullets in the shell and the angle of opening, the calculation of the bullet density can be effected.

In dealing with the question of what is the best distance to burst the shell short of the target, a consideration of the bullet density in relation to the nature of the target is of the first importance.

Shrapnel is essentially a man killing projectile and consequently it is only proposed to take the effect of various bullet densities on targets composed of men in various positions.

In figures 1, 2, 3, 4, are shown to scale circles 5 yards in diameter on which are distributed bullets in accordance with an average bullet density of 0·25, 0·5, 1·0, 2·0 bullets per square yard respectively. The dotted figures represent, on the same scale, the vulnerable target offered by a man in various positions. This enables us to compare directly the bullet density and the target fired at. To get a really

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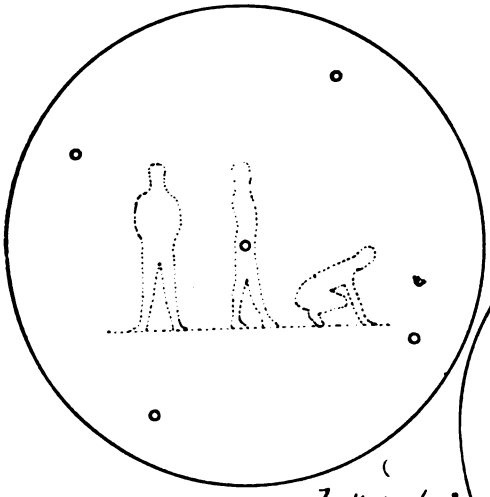
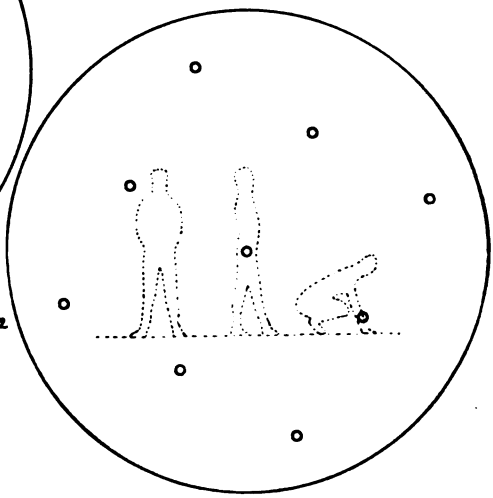
FIG. 1.



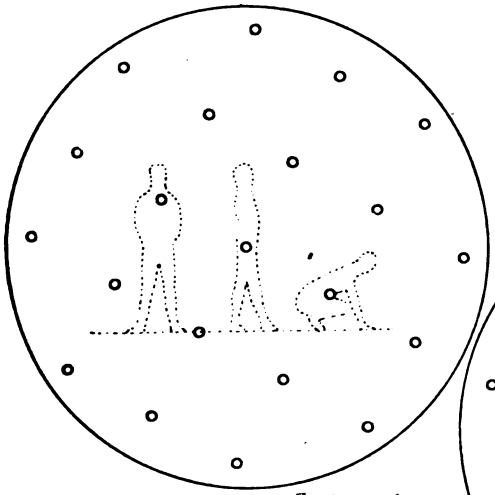
Density – 0·25 bullets/yd²

FIG. 2.



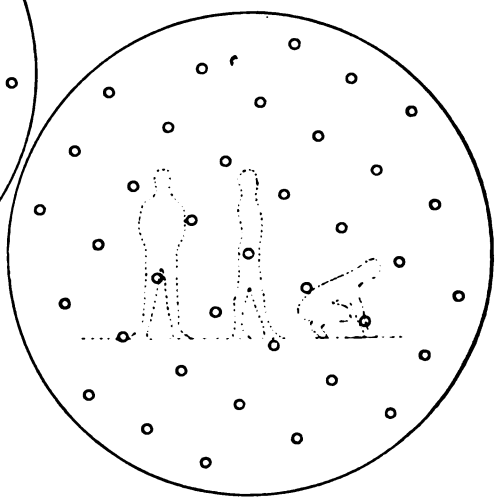
Density – 0·5 bullets/yd²

FIG. 3.



Density – 1·0 bullets/yd²

FIG. 4.



Density – 2·0 bullets/yd²

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good comparison the figures should be outlined on a piece of tracing paper and moved about to different positions in the circles; they have been placed centrally here merely for convenience.

Examining the 0·25 and 0·5 circles we see that a man can very well come into circles of these densities and not be hit at all. When we come to a density of 1·0 his chances of escape are small, while in a density of 2·0 if he is hit by one bullet he will very likely be hit by two, or at any rate the bullets are so close together that it is unlikely that two of them will hit two different men; this is a closer pattern than we want.

A reasonable basis on which to regulate the bullet density would seem to be to so arrange it that the pattern should be close enough to make the chances of a man escaping a hit small, and yet not be so close that more than one bullet will be wasted on a single man. These conditions are fulfilled by a bullet density of about 1·0 bullet per square yard.

The greater the bullet density the less the total diameter of the bullet circle or "spread" of the bullets, another reason for not using a closer pattern than necessary.

The bullet density at the target depends on the distance the shell is burst short of the target. This can be estimated from the battery by measuring the angular height of the burst above the line of sight; the corresponding values can be calculated from a knowledge of the angle of descent.

Application to the Q.F. 18-Pr.:—

Diagram A has been prepared to show the bullet densities corresponding to various distances burst short at different ranges, with the 18-pr. Q.F.

The straight line joining the range to the distance burst short cuts the centre scale at the corresponding bullet density and "spread."

Diagram B gives the angular height of burst above the line of sight corresponding to various distances burst short at different ranges, with the 18-pr. Q.F.

The straight line joining the range to the distance burst short cuts the centre scale at the corresponding angular height of burst.

Applying these diagrams in succession we get the following results:—

Q.F. 18-pr. Bullet Density.—1 bullet per square yard.

Range.	Burst short.	Angular height of burst above L. of S.
2000ˣ	60ˣ	8′
3000ˣ	53ˣ	8½′
4000ˣ	50ˣ	9′
5000ˣ	47ˣ	10′
6000ˣ	45ˣ	11′

or say a mean angular height of burst above the line of sight of 10′.

Referring to "Field Artillery Training," 1908, Appendix II. (as amended 1910), we have laid down:—

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"The effective points of burst are taken to be as follows:—

At	2000 yards	110ᵡ	short.
	3000 „	100ᵡ	„
	4000 „	90ᵡ	„
	5000 „	80ᵡ	„
	6000 „	70ᵡ	„

Applying diagram A the corresponding bullet densities are:—

At	2000ᵡ	0·3	bullets per	square yard.
	3000ᵡ	0·3	„ „	„
	4000ᵡ	0·3	„ „	„
	5000ᵡ	0·35	„ „	„
	6000ᵡ	0·4	„ „	„

In the amendments for 1910 to para. (d), p. 57, "Field Artillery Training," we also have:—

"The normal height of burst of Q.F. shrapnel is about 15′ above the line of sight at all ranges."

Applying diagrams A and B we get the following results:—

Q.F. 18-pr. Angular height of burst above line of sight.—15′

Range.	Corrector normal.	Density.
2000ᵡ	40ᵡ	0·25
3000ᵡ	40ᵡ	0·3
4000ᵡ	40ᵡ	0·4
5000ᵡ	37ᵡ	0·45
6000ᵡ	34ᵡ	0·55

Comparing the spread with "corrector normal" and for a bullet density of 1·0 we get:—

	Diameter of bullet circle.	
Range.	Corrector normal	Density of 1 bullet per sq. yd.
2000ᵡ	120ᵡ	21½ᵡ
3000ᵡ	95ᵡ	„
4000ᵡ	80ᵡ	„
5000ᵡ	70ᵡ	„
6000ᵡ	60ᵡ	„

APPENDIX.

To facilitate calculations relating to other guns, two additional diagrams have been prepared.

Diagram C gives the corresponding values of bullet density (D bullets per square yard), and distance burst short (sᵡ) for a shell containing N bullets and having an angle of opening of α°.

To use it:—Join the values of N and α by a straight line. Join the point where this straight line cuts the undivided central line to the value of s. This straight line produced will cut the D scale at the required value.

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E.G. A shell containing 250 bullets and having an angle of opening of 18° burst 50ˣ short will give a density of about 1·3 bullets per square yard at the target (see dotted lines).

Diagram D gives the corresponding values of angular height of burst above the line of sight (η'), and distance burst short (s^{x}), at a range (R^{x}) ˣ at which the angle of descent for the gun in question is β°.

To use it: Join R to β. Join the point where this straight line cuts the central line to s. This straight line produced will cut the η scale at the required value.

E.G. Shell with an angle of descent of 8° at 3000ˣ. The angular height of burst above the line of sight for a burst short of 75ˣ is 12′ (see dotted lines).

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Pocket Fuze Scale for 60-pr. B.L. Gun.

By LIEUT. W. F. ARMSTRONG, R.G.A.

AMONG the minor worries of a B.C. fighting field guns with no independent line of sight are:—

1. The mental arithmetic involved in adding or subtracting the angle of sight from the range to obtain the elevation.
2. Reading off the fuze nearest to the range found by the guns.
3. Allowing one-thirtieth of the fuze for each 1000 feet.
4. The absence of a corrector.

The mechanical device, of which a description follows will overcome these difficulties.

60-PR. B.L. FUZE SCALE T. & P. FUZE NO. 62.

Description:—

The scale consists of a block of wood 6½″ × 3″ with two sides let into it. The left-hand one mechanically adds or subtracts the angle of sight. The right-hand slide gives the fuze for any range and being logarithmically divided, the small scale on its left acts as a corrector.

Method of use (see diagram):—

Range takers give range 6000 yards.
Angle of sight + 1° 45′.

Push the slide marked "RANGE" at the top until the black index reads + 1° 45′. Then opposite 6000 yards is 6800 yards; this will be the elevation to give the guns.

When ranging has been completed and the necessary elevation found to be, say, 7000 yards; look opposite 7000 yards on the scale marked ELEVATION and on the scale marked RANGE will be found 6200 = range found by guns.

If it is now desired to obtain the fuze, push the slide of fuzes until the index is at your height above sea level, or the reading of the barometer, or the reading (*i. e.*, corrector) found suitable for the day, say + 2000 feet. Opposite 6200 (the range as found by the guns) is fuze 21½. This will be the fuze that should give 10% grazes. For a bracket give 20½ increase 1½.

For ranges below 2900 the fuze can be found on the centre scale. The corrector is unnecessary below this range.

If firing direct, of course only the two right-hand scales are used.

If preferred, the scale marked ELEVATION might be marked off in degrees and minutes instead of yards; they would then be equidistant.

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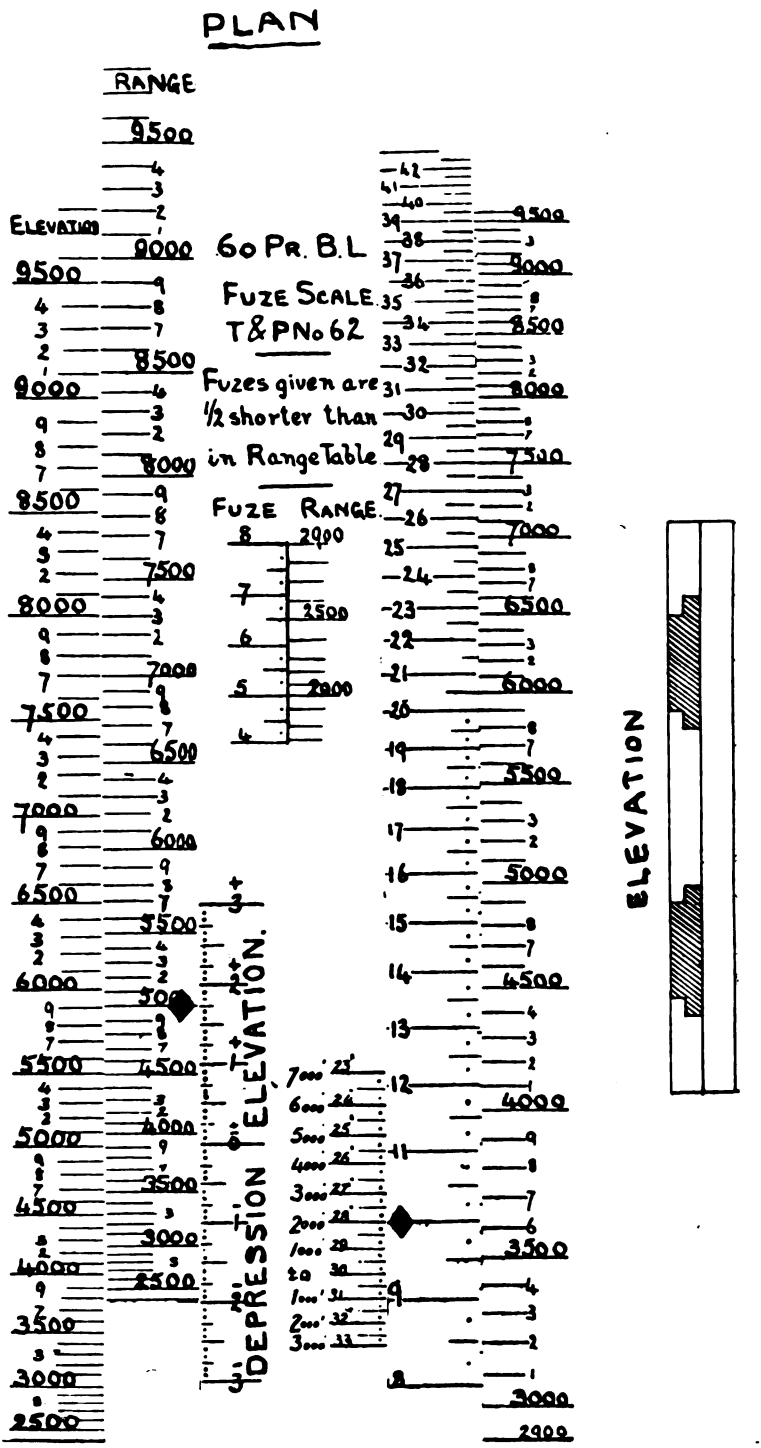

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NOTE.—The reason for coming back ½ from graze is shown as follows:—

The mean error of time of burning of the fuze No. 62 has been given by Captain Hill as ·25 secs. from 0–30. This gives the following results on working out according to page 59 "Field Artillery Training," to find the distance short to burst the shrapnel to get 10% graze.

yds.	yds.	
At 2000	– 202 = ½	division of the fuze taken from the range
3000	– 174 = ½	[table.
4000	– 153 = ⅝	
5000	– 139 = ⅝	
6000	– 130 = ¾	
7000	– 125 = ¾	
8000	– 120 = ⅞	
9000	– 117 = 1	

To be accurate one should come back these amounts from the shortest graze, as an approximation for all ranges ½ was taken.

Advantages over Range Table for B.C's use:—

1. Once the setting for the day has been found correctly the fuze for any range is given. (This worked out at last year's practice camp).

2. It is easier to mechanically subtract one-thirtieth of the fuze for each 1000 ft. above Mean Sea Level.

3. When the range and fuze has been found at a moving target; if the range alters the new fuze is ready opposite the new range.

4. The angle of sight is added to the range mechanically and is quicker and more accurate than mental arithmetic.

Disadvantage:—

If the angle of sight has been incorrectly found; the setting of the corrector will not be the true one just as with the Field Artillery corrector.

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Notes for Promotion Examinations on the Franco-German War.

By LIEUT. J. C. G. HUNTER, R.G.A.

(By kind permission of Col. Leyland Needham).

FRENCH PLAN OF CAMPAIGN.

A. *A rapid offensive.* It being hoped that such a movement would lead to the South German states holding aloof. The loyalty of the latter to Prussia was much doubted.

(The probable attitude of the South German states was the first miscalculation made by France. At the same time although the unanimity with which these states joined Prussia largely increased the force to be arrayed against France, it at the same time gave the latter a much more extended frontier on which to choose a point of attack.

South German States.—77,000 infantry, 9100 cavalry, 300 guns.

B. To carry out this offensive stroke, the concentration of the French armies on the frontier as quickly as possible was desirable. To concentrate quickly full use must be made of the railways from the interior to the frontier and, therefore, the French corps had to be concentrated in two main groups:—

(1). At Metz.
(2). At Strassburg.

The plan arranged, therefore, was to mass:—

(a). 150,000 at Metz.
(b). 100,000 at Strassburg.
(c). 50,000 at Chalons as a reserve.

(a) and (b) were then to:—

(i.) Unite.
(ii.) Cross the Rhine at Maxau.
(iii.) Force the South German states into neutrality.
(iv.) Advance towards the Main and seek a general engagement with the Prussians.

The French fleet was also to attack North Germany and a descent on the shores of the North Sea carried out; but this item of the programme was never attempted.

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Comments on the above plan:—

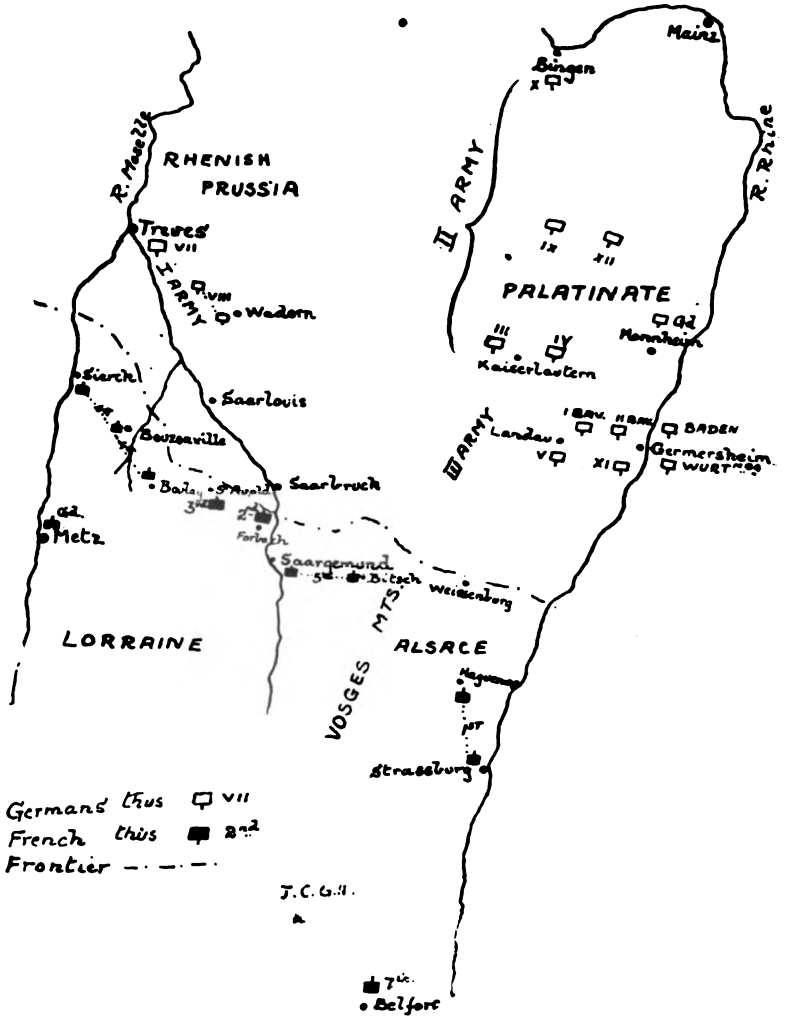
To carry out the above plan it would be necessary:—

1. To cross the Rhine before the German armies could be mobilized and assemble.

2. To overawe South Germany.

3. To mask the Rhine fortresses.

(2) and (3) would absorb a large proportion of the invading troops. Even, therefore, supposing (1) could be accomplished, what prospect would there be of defeating the army which Prussia would assemble to bar the road to Berlin?



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GERMAN PLAN OF CAMPAIGN.

To concentrate the whole of the German forces in three armies in the Palatinate, and then to advance and attack the enemy at once wherever found.

To effect the above:—

The Ist Army (Steinmetz) consisting of the Ist, VIIth, VIIIth Corps and 1st and 3rd Cavalry Divisions were to assemble in Rhenish Prussia at and to the S. of Treves.

The IInd Army (Prince Frederick Charles) consisting of the IInd, IIIrd, IVth, IXth, Xth, XIIth, Guard Corps, and the 5th and 6th Cavalry Divisions, were to assemble in the Palatinate S.W. of Mainz.

The IIIrd Army (The Crown Prince) composed of the Vth, VIth, XIth, Ist and IInd Bavarian Corps, the Baden and Wurtemburg Divisions, and the 2nd and 4th Cavalry Divisions, were to assemble in the line Landau—Germersheim.

Comments on the above:—

The above concentration left the S. German states without any direct defence. But it had been pointed out by Moltke that S. Germany would be best protected by an offensive movement into Alsace from the middle Rhine, and the Governments of Bavaria, Baden, Wurtemburg and Hesse had acquiesced to the plan.

Any invasion of the Rhenish provinces, *i. e.*, the Palatinate and Rhenish Prussia, would be directly opposed by the combined German armies. While if the French crossed the upper Rhine their flank would be menaced by the same armies.

Four reasons why the Germans assembled in the Palatinate and Rhenish Prussia.

1. They were on the part of the frontier which could be most quickly reached.

2. They were on the shortest line to Paris.

3. They were best placed for meeting all contingencies.[1]

4. They were on the side of the angle parallel to the French communications and, therefore, in the most favourable position for operating against them.

FIRST CHANGE IN FRENCH POSITIONS.

The distribution described above had been ordered to carry out the original French plan of campaign. But the presence of the forces which the Germans were directing against the northern face of the French angular frontier made it felt that the Metz army was all too

[1] (a) The scheme it was actually proposed to carry out.
(b) An early irruption into the Rhenish provinces.
(c) A march of the French through Belgium: but it was not probable that France would thus violate the neutrality of Belgium still there was always the possibility.

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weak to oppose them; breaking in there the Germans might even cut the force at Strassburg from Paris.

Wherefore the French Emperor, leaving the double frontier line of the Rhine and the Vosges mainly to the protection of its fortified places, directed the 1st Corps (MacMahon) and the division of the 7th Corps (Douay) at Belfort, to move down the Rhine valley to take post East of the 5th Corps (De Failly) at Bitsch, and so prolong the occupation of the menaced point.

Note on the German advance to the frontier:—

The Rhine provinces being unprotected, the troops were brought by rail only as far as the Rhine. Thence they continued by march route.

The three armies advanced in a general curve, the Ist and IIIrd being pushed forward.

The French might attack and, therefore, positions for defence were prepared in advance.

The Ist and IInd armies were advanced because the IInd army had to pass through the Kaiserslautern defile.

The Ist army would have little difficulty in holding its own in the mountainous district near Treves and, therefore, the IIIrd was most exposed to attack.

POSITIONS ON THE 31ST JULY.

Germans:—

Ist Army (Steinmetz):—

VIIth Treves.
VIIIth echeloned along the Wadern road.
Ist and 1st Cavalry Division en route to join (joined after 6th August).
3rd Cavalry Division.

IInd Army (Prince Frederick Charles):—

IIIrd and IVth S.W. of Mainz in front line.
Xth at Bingen in rear of the right.
Guard at Mannheim in rear of the left.
IXth and XIIth in rear of the centre.
IInd en route to join (joined after 6th August).
5th and 6th Cavalry Divisions.

IIIdr Army (The Crown Prince):—

Vth, XIth, and Ist Bavarian Division Landau—Germersheim in front line.
IInd Bavarian Division in second line.
Baden and Wurtemburg Divisions on the right bank of the Rhine.
VIth and 2nd Cavalry Division en route to join.
4th Cavalry Division.

Total with 19th Infantry Division and 4 Landwehr Divisions:—

462,000 infantry.
56,000 cavalry.
1,584 guns.

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Notes on German positions:—

Army Corps = 2 divisions.
Division = 2 brigades.

A German Army Corps averaged:—

25,000 infantry.
1,200 cavalry.
84 guns.

except the Guard and XIIth (Saxons) which had

29,000 infantry.
4,800 cavalry.
90 guns.

The IXth Corps = 18th and Hessian Divisions.
(17th watching the coast and the Danes).

The three Corps (Ist, IInd, and VIth) would be available to hold Dresden and the other Elbe fortresses to check the Austrians if they joined France.

French:—

Right Wing (MacMahon):—

1st (MacMahon), Strassburg—Haguenau.
7th (Douay), Belfort—Lyons.

Left Wing:—

2nd (Frossard), Forbach.
3rd (Bazaine), St. Avold.
4th (Ladmirault), Boulay, Bouzonville, Sierck.
5th (De Failly) Saargemund—Bitsch.
Guard (Bourbaki), Metz.

Reserve:—

6th (Canrobert), Chalons.

Total.—210,000 men and 925 guns raised by reservists to 270,000 men early in August.

There was also a reserve of cavalry in three divisions, one near Strassburg and two near Metz; total 6,000.

The Ist and IInd German armies continuing their advance from the positions shown on 31st July had their leading troops approaching Saarbruck on the morning of the 6th August. The IInd from the N.E. and the Ist from the N.W.

The VIIth Corps, at the head of the Ist Army, was advancing by the Treves road, having the 14th division pushed forward as the advanced guard of the whole army.

The IIrd Corps, leading the IInd Army, had as its advanced guard the 6th division.

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On the French side, the 2nd Corps which had occupied Saarbruck on the 2nd August had fallen back to the Spicheren heights.

Movements in the French camp observed by the German cavalry on the evening of the 5th, caused a belief that the whole of the French line was retiring, and it was therefore believed that the 2nd Corps at Spicheren was merely acting as a rear guard, and would shortly fall back.

Kameke (O.C. 14th Division) had asked whether, under the circumstances, he might cross the river and was told to act on his own judgment, so he pressed southward.

It was expected that the whole French army might fall back behind the Moselle from Metz to Thionville. In this case the Ist Army was to hold them in front and the IInd Army to make a circuit south of Metz and force the French to retire or fight.

Notes on the Battle of Spicheren (see map facing page 312):—

The vanguard of the 14th Division passing through Saarbruck reached the drill ground and was shelled. Prussian scouts reported the Rotherberg held by only 7000 men and 8 guns. Kameke (O.C. 14th Division), therefore, determined to attack. The 27th brigade attacked the spur, two battalions attacking each flank, and two being kept in reserve. Neither attack could be pushed forward very far, and by 2 p.m. the whole of the 27th brigade was in the firing line with no reserves and in the presence of three times their numbers. Frossard, believing that three other divisions were being sent to him, made no counter-attack.

2.30 p.m. The 28th brigade was being rapidly pushed forward to assist the 27th, and the advanced guards of the VIIIth and IIIrd Corps were approaching Saarbruck. Gradually reinforced, the Prussians won the north edge of the plateau, but in front of them lay a still stronger position. An attack supported by artillery fire was being pushed against this when the French made a general advance; but, unable to gain ground, they suddenly fell back under cover of their massed artillery in rear. On the Prussian right also a vigorous advance by the French re-captured Steiring Copse, and a further effort would have resulted in a French victory; but Frossard, hearing that German troops were advancing by the Volklingen—Forbach road (13th Division), and fearing that his retreat would be cut off, ordered a general retirement. This was conducted in fairly good order on Saargemund. The 3rd Corps at St. Avold was only 9 miles distant.

Instructions to O.C. IIIrd Army:—

To cross the frontier; then

1. If MacMahon had fallen back to join the Emperor, to watch Strassburg and with the remainder to wheel to the right through the Vosges and join the IInd Army on the Saar.

2. If the French were still in Alsace, *to attack them wherever found.* (The latter was the guiding principle of all the German plans).

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FRENCH POSITIONS ON THE MORNING OF THE 4TH AUGUST.

1st Corps:—

2nd Division (Douay), Weissemburg.
1st Division (Ducrot), Lembach.
3rd Division (Raoult), Reichshoffen.
4th Division (Lartigue), Haguenau.
Cavalry, Sulz.

7th Corps:—

1st Division, Colmar.

THE BATTLE OF WEISSEMBURG.

(See map facing page 312).

An attack by the Bavarians was strongly resisted, but the Vth Corps in the centre and the XIth Corps on the left, crossed the stream and attacked the French right. 30 guns were massed against Weissemburg and the French ultimately driven back in disorder, but no pursuit was carried out by the Germans.

Mistakes of the French:—

1. Exposing a weak division to attack by overwhelming numbers.

2. Defective scouting which allowed the force to be attacked. (Parties were sent out on the evening of the 3rd and morning of the 4th August, and both reported that they had seen no sign of the enemy).

N.B.—The position of the French cavalry at Sulz in rear.

3. Not breaking down the bridges over the Lauter.

Both Ducrot and MacMahon excuse themselves for exposing the detachment, but the truth seems to be that the French did not believe the German advance to be anything more than a reconnaissance in force, and therefore the blame should really fall on the French cavalry, which ought to have recognised the true character of the German advance.

WOERTH.

(See map facing page 312).

French position:—

Froschwiller to near Eberbach. The left was at first refused, but afterwards pushed forward to Neuwiller.

French dispositions:—

1st Corps. 3 divisions in front line and 1 in reserve.
7th Corps. 1 division near Eberbach.
Michel's cavalry brigade behind the right flank.
Two cavalry brigades in rear of the centre.
Artillery dispersed along the line.

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German advance:—

IInd Bavarian Corps through Lembach, facing west.

Vth Corps through Preuschdorf, facing west.

XIth Corps at Sulz.

Ist Bavarian Corps in reserve behind the Vth Corps and IInd Bavarian Corps.

Course of the action:—

The IInd Bavarians coming from the north advanced through Langensulz–Bach and were then checked, and owing to a misconceived verbal order retired out of action. The Vth meanwhile, hearing the firing, brought all its guns into action opposite Woerth, and batteries of the advanced guard of the XIth joined. (The Vth had 84 guns massed and the XIth 24).

The advanced guard brigade of the Vth crossed at Woerth and the advanced infantry of the XIth at Spachbach. Orders now came to break off the action, but owing to the difficulty of retiring the troops it was continued. Ultimately the whole of the XIth Corps infantry got across the river, wheeled to the right through the Neider wald and fought their way up the slopes. They were charged by Michel's cavalry brigade from Morsbronn. The Vth also fought its way across, and the Bavarians arrived from the north, and the whole pressed forward in a gradually narrowing ring to Froschwiller, the capture of which ended the battle. The French fell back towards Reichshoffen and Niederbronn in great disorder.

DISCUSSION OF THE STRATEGICAL VALUE OF THE POSITION AT WOERTH.

After the defeat at Weissemburg the best course to pursue would have been to concentrate the right wing of the French army behind the Vosges (*i. e.*, the 1st, 5th, and 7th Corps). This the Emperor wished to do, but MacMahon wished, and was allowed to take up a position at Woerth.

Strategical advantages claimed for the position at Woerth:—

For this course is was claimed:—

1. That time would be gained for a concentration behind the Vosges.

2. That Alsace would not be altogether abandoned.

The passes through the Vosges would be covered.

4. The flank of the IIrd German Army would be threatened if it pursued a southerly course.

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Strategical disadvantages of the position at Woerth:—

On the other hand, the position had strategically the following disadvantages:—

1. It was too far forward to admit of adequate concentration in view of the dispersion of the French right wing.

2. It would be difficult to retreat from.

3. If necessary (from political reasons) to fight east of the Vosges, Strassburg would have been a better base; or a position behind the Moder, south of Haguenau forest, covering the Strassburg —Nancy railway and in touch with the army at Metz, would have been better.

From Strassburg an offensive blow could be struck at the flank of an army trying to pass the Vosges.

However it was determined to take up the position.

Force assembled at Woerth:—

The 5th Corps was placed under the command of MacMahon, and on the morning of the 6th August there were at Woerth under command of MacMahon the 1st Corps and 1 division of the 7th Corps, but of the 5th Corps one division only had started from Bitsch.

SUCCESSIVE PLANS FORMED BY THE FRENCH EMPEROR AFTER THE 6TH AUGUST.

When the news of the disasters at Woerth and Spicheren came in and it became evident that the position along the frontier was no longer tenable.

The Emperor's *first* idea was:—

To fall back behind the Meuse; and orders having this end in view were issued to the several corps.

On the following day the plan was changed, mainly owing to political reasons, and

The Emperor's *second* idea was:—

To oppose the Germans on the right bank of the Moselle, and to this end to take up a position behind the French Nied. Consequently all the orders issued the previous day were revoked and fresh orders issued. The position was occupied by the 3rd Corps and the Guard on the 10th August extending from Pange to Les Etangs. Entrenchments were begun when, owing, it is stated, to the position being found defective, the plans were again changed, and

The Emperor's *third* idea was:—

To retire the army under the shelter of the forts of Metz. Orders for this were issued on the 11th August. The army accordingly fell back. Once again the plans were changed, and

The Emperor's *fourth* idea was:—

To carry the army as quickly as possible to Verdun, leaving only

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one division in Metz. (This was embodied in the instructions he gave to Bazaine on handing over the command of the army on August 12th).

NOTE.—The military situation on the 7th August dictated undeniably a retirement behind the Moselle and probably still further behind the Meuse. The Emperor saw this, but was turned from his intentions by political considerations and the representations of his counsellors. But even from a political standpoint the course was an error. And, the retreat determined upon, it should have been carried out without delay. To carry the army over the Moselle was the first step, and this might have been done without a shot being fired.

MORAL—When a retreat becomes necessary, carry it out without loss of time; campaigns have been lost as much by *postponed retreats* as by rash advances.

Five or six valuable days were lost, during which the French army might have crossed the Moselle unmolested, in carrying out the successive plans determined on. Had the retreat been at once carried out, the German cavalry, it is true, might have hung on the rear of the retreating columns, but it could have done nothing as its infantry would still have been far to the rear. From a political stand point also a retreat would have been wise, because whatever discontent there might be, the enemies of the Napoleonic dynasty would hardly have ventured upon open revolution while the Emperor was still in the field at the head of the army.

Retirement of the French right on Chalons after Woerth:—

After Woerth MacMahon had fallen back on Savern, thus entirely severing himself from the main army. Union with this might have been effected by the Luneville—Metz railway; but in view of the state of the troops, the 1st Corps marched to Neufchateau and thence by train to Chalons. The 5th and 7th Corps followed it to Chalons from Bitsch and Belfort. No attempt was made to blow up the tunnels at Savern and Phalsburg or to in any way retard the German advance.

Comment on the action of the French after Woerth and Spicheren:—

Was it necessary thus to give up the whole of the country east of the Moselle?

Probably under the circumstances it was advisable.

1. The positions on the Nied were not suitable for an army of the strength of Bazaine's.

2. The co-operation of MacMahon could hardly be expected.

3. Although the defence of the Moselle, either above or below Metz, offered many advantages, Metz itself was in a most defenceless state, and it was necessary to secure its safety by marching Bazaine's army through it.

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THE GERMAN STRATEGICAL WHEEL TO THE RIGHT.
(6th—12th August).

French position after Woerth and Spicheren:—

Their position facing north for defence was no longer tenable. The right wing had been routed at Woerth. The left (main Imperial army) was threatened in front by superior numbers though only one of its corps had been engaged (the 2nd at Spicheren).

Courses open to the French after Woerth and Spicheren:—

It was necessary now to *unite* the whole French army, *i. e.*, the two wings.

How this union might have been effected.

1. Both groups to retire direct on Chalons and unite there.
2. The left group (main army) to retire to Metz and endeavour to close the right wing on it.
3. To take up a defensive position behind the Moselle south of Metz.
4. To take up a defensive position behind the Moselle north of Metz with their left on Thionville.

There was much dispute among the French leaders as to which of these courses to adopt, but it was ultimately decided *to retreat to Chalons.*

French retirement on Metz en route for Chalons:—

Meanwhile orders and counter-orders succeeded one another rapidly. The main body first deployed behind the Nied, but hastily abandoned the position as untenable. Eventually on the 13th August, the left wing of the French army (2nd, 3rd, 4th, and Guard Corps) were assembled under cover of the forts to the east of Metz, and were joined by part of the 6th Corps from Chalons. Total, 176,000 men and 540 guns. Command of this force was now definitely handed over by the Emperor to Bazaine.

German movements after the 6th August:—

Touch with the French was lost. It was assumed that a stand would be made on the line of the Moselle if not more to the east. It was determined to advance west, on a broad front, the several columns within supporting distance.

A. A strategical wheel to the right was, therefore, the first operation.

The Ist Army to halt.

The IInd Army to gain ground gradually to the south.

The IIIrd Army on the outer flank to swing round through the Vosges.

B. After the wheel was completed, *i. e.*, after the Saar was reached on the 12th August, the lines of advance, or marching area of the three armies were:—

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The IIIrd Army, the Saarunion—Dieuze road and those to the south of it.

The IInd Army, the St. Avold—Nomeny road and those to the south of it.

The Ist Army to cover ground north as far as the Saarlouis—Metz main road.

German plans for contingencies during the march on the Moselle.

Five courses of action open to the French.

1. If the French turned and attacked the Ist Army.

Two Corps on the right of the IInd Army were ordered to halt a little south of Metz and be ready to deliver a flank attack.

2. An advance south on the right bank would come upon the IInd and IIIrd Armies in mutual support.

3. An advance up stream on the left bank of the Moselle.

The IInd Army to await the support of the IIIrd Army while the Ist Army crossing above (*i. e.*, south) the fortress would attack the enemy in flank and rear.

4. If the French took up a position between Metz and Thionville.

The Ist Army to hold them in front while the IInd Army made a circuit south of Metz to threaten the line of retreat.

5. If the French retreat west on Chalons were continued.

The cavalry were to push forward and harass the retiring troops while the IInd Army was to cross the Moselle and wheel up on the flank of the French line of march.

Provision was thus made for all contingencies and the German armies on the 13th August continued their advance to the line of the Saar. On the evening of the 13th the Ist Army (Steinmetz) had two Corps, Ist and VIIth, behind the French Nied.

Ist Corps at Les Etangs.

VIIth Corps at Pange.

The outposts of each corps consisted of a brigade (one-fourth of strength).

The brigade of the VIIth Corps was the 26th (von der Goltz) and the front line of sentries extended from St. Barbe on the right to Ars Laquenexy on the left.

French positions on the 13th:—

The French army at this time was between Fort Queleu and Fort St. Julien on the left.

2nd Corps (Frossard) on the right.

3rd Corps (Decaen) in the centre.

4th Corps (Ladmirault) on the left.

The Guard (Bourbaki) in rear of Borny.

The French outposts were thrown forward towards the Metz—Saarbruck railway on the right, beyond the Colombey brook in the centre, and beyond Nouilly, Vremy, and Servigny on the left.

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How the French retreat had been delayed:—

The Emperor, before giving over the command of the army to Bazaine on the evening of the 12th August, had given orders to construct bridges over the Moselle; 12 to 15 of these pontoon bridges had been made, but rain fell heavily, the Moselle flooded, and some of the bridges were damaged and others partly submerged; therefore the retreat ordered for the 13th had to be postponed until the 14th. Consequently on the evening of the 13th the French corps still remained in their positions, excepting only the 6th Corps, which, being in the town near one of the permanent bridges, had partly crossed the river.

14th August (see map facing page 312):—

The retreat of the French troops from the positions here did not begin until afternoon, the 2nd and 4th Corps then began to file away with the exception of one division of the 4th Corps, which, as well as the whole of the 3rd Corps, remained for the time in position.

The O.C. Ist German Corps (Manteufel) could not see whether the movements observed were for a retreat, or an assembly for an attack upon the VIIth Corps. He therefore ordered his divisions to stand to their arms. The outposts of the VIIth Corps more to the south recognized that the movement was a retreat, and the O.C. outposts (von der Goltz) at once attacked. The village of Colombey was captured, but here the further advance of the brigade was stopped. Meanwhile the O.C. Ist Corps, hearing firing on his left, at once pushed forward advance guards from his two divisions already under arms south from St. Barbe and joined on with them to the right of von der Goltz.

Of the VIIth Corps the other brigade of the 13th division (25th) pushed forward to the assistance of the 26th brigade, and the O.C. VIIth Corps (von Zastrow), although he did not quite approve of the attack made by von der Goltz, seeing that the 13th division was heavily engaged, ordered the 14th division (von Glumer) to follow to its assistance.

Arrival of the Ist German Corps:—

The artillery were sent on in advance and soon had batteries in position protected by cavalry, the 1st division advanced on Noisseville and Nouilly, the 2nd division along by Montoy. Noisseville and Nouilly were captured and even the barricaded village of Mey was stormed; but now the advance of the two divisions of the 4th French Corps obliged the Germans to fall back. But more infantry and guns of the Ist Corps came up, and so the counter-attack by the divisions of the 4th Corps was stopped, and ultimately the French fell back into bivouacs near Metz.

When the attack by the 26th brigade (von der Goltz) was begun the 6th and 2nd French Corps were already across the river. But the 3rd Corps (four divisions) was quickly formed into line. The Guard Corps fell into line behind the 3rd Corps and sent a brigade towards the Seille to protect the right of the 3rd Corps. The 4th Corps (the

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two divisions which marched off) returned and Ladmirault sent his 1st division (De Cissey), followed by the 3rd division (Lorencez), to the north-east to attack the right of the Ist German Corps. Meanwhile on the French right Colombey had been taken by the German 26th brigade, but the advance could not be pushed beyond it. The 25th brigade (13th division) first came to support the 26th brigade, and with its assistance some little ground in advance was gained; then the 14th division came up (first the 27th brigade then the 28th). Some further ground was gained, but still no material progress could be made. At 7 p.m. the 18th division (IXth Corps) arrived, but still no progress was possible, and ultimately here also the French fell back to Metz, the guns of the permanent works checking any pursuit.

Points to be noted in the battle:—

1. The way in which any German troops in the vicinity at once marched to the sound of firing.

The battle was begun by the attack of a single brigade, this drove in the French outposts and captured Colombey but could not push on, and the French having turned, the Germans were attacked by a greatly superior force. But now to its assistance came:—

(a). The advanced troops and guns of the Ist Corps.
(b). The main body of the two divisions Ist Corps.
(c). The remainder of the VIIth Corps.
(d). The 18th division (IXth Corps).

That these several bodies were hurried to the scene of action on the initiative of their several commanders is evidenced by the fact that the O.C. Ist Army (Steinmetz) did not arrive on the scene of action until the fighting was drawing to a conclusion and then was very angry that a battle had been fought.

He was apprehensive that a counter-attack might be made by the French at dawn and, therefore, ordered the Ist and VIIth Corps to retire on the positions they had occupied in the morning, but the O.C. VIIth Corps (von Zastrow) insisted that his corps should bivouac under arms on the battlefield so that the wounded might be collected and the honour of the army vindicated.

2. The way in which the German artillery pushed to the front as soon as they became aware that their advanced troops were engaged. Both on the right and left of the German line as soon as the advanced troops became engaged, the artillery of the divisions at once pushed forward into line with the advanced troops, and there can be no doubt that had not the batteries thus massed forward in advance, it would have gone hard with the leading troops in view of the numerical superiority of the French forces in front of them.

The above are facts and teach two instructive lessons:—

(1). March at once to the sound of firing.
(2). Push forward batteries at once to support advanced guard engaged.

Batteries can push forward quicker than supporting infantry can. Of course in each case certain risks may be run and, theoretically,

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neither may be a prudent procedure, but the German subordinate leaders did not hesitate to take the risks, and it paid them well.

Was the battle of Borny worth fighting?:—

Tactically the battle can hardly be claimed as a German victory. Some writers maintain that no important strategical results were gained by it and that even had the battle not been fought at all the French retreat would have been equally well intercepted. On the other hand, Colonel Maude gives it as his opinion that if the man on the spot, Von der Goltz, had not attacked at Borny the moment he saw signs of withdrawal in the French lines, the 4th Corps (Ladmirault) would have got clear across the Moselle that night (14th–15th), and all the confusion in the streets of Metz resulting from the fight having been eliminated, either the whole army, less the garrison left in Metz (one division), would have escaped altogether to Chalons or the Prussians would have found a fourfold superiority, at least, against them on the 16th August.

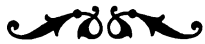
With reference to the above, it is worthy of note that it was to allow time for a division of the 4th Corps still in rear to come up that caused the resumption of the retirement of the French army, which had been ordered to begin early on the 16th, to be delayed until after mid-day on the representation of Marshal Le Boeuf, and it was the attack on Borny on the afternoon of the 14th which made the 4th French Corps, already retiring, turn about and remain engaged until darkness had set in.

Whether, however, it would have been possible to pass the whole French army over the Moselle more quickly than actually happened must always remain a matter of speculation.

EVENTS OF THE 15TH.

Expecting a possible counter-attack on the morning of the 15th the Ist German Army and IIIrd and IXth Corps (IInd Army) remained in their positions during the early part of the day. After mid-day it became evident that the French were really retreating, and the whole of the German Corps were set in motion for the Moselle. By the evening of the 15th the positions shown on the map were reached by the several corps. On the other side the retreat of the French across the Moselle was carried on uninterruptedly during the night 14th-15th and during the 15th; and by the evening of the latter day they also had reached the positions shown on the map overleaf.

(To be continued).



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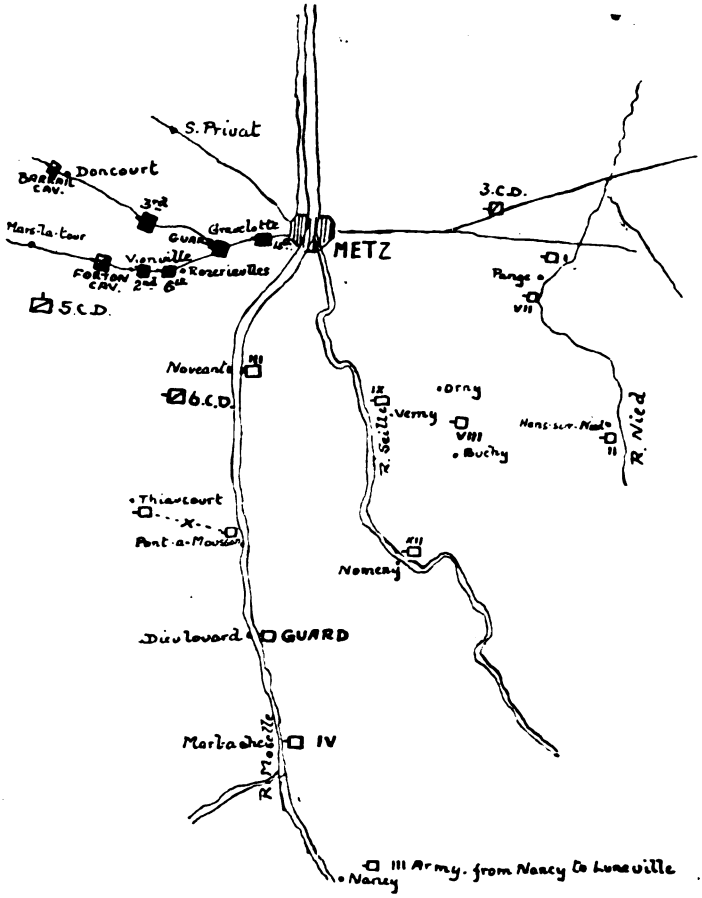
Positions, evening August 15th.



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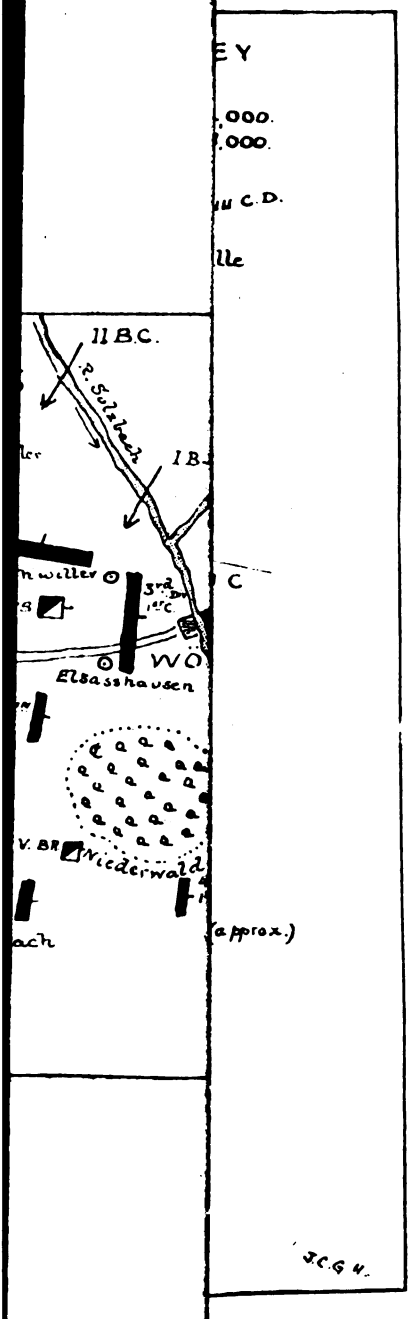

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Notes for Promotion Examinations on the Franco-German War.

By LIEUT. J. C. G. HUNTER, R.G.A.

(By kind permission of Col. Leyland Needham).

(Continued from page 312).

Orders issued by Von Moltke on the evening of the 15th:—

Ist Army.—To leave one corps (Ist Corps) at Courcelles sur Nied and to place the other two corps at Arry and Pommerieux between the Seille and the Moselle.

IInd Army.—" It is only by a vigorous offensive movement of " the IInd Army upon the routes from Metz to Verdun by Fresne " and Etain that we can reap the fruits of victory obtained yesterday. " The commander of the IInd Army is entrusted with this operation " which he will conduct according to his own judgment and with the " means at his disposal, that is all the corps of his army."

General idea of movements ordered by O.C. IInd Army for 16th August:—

Cavalry.—The 6th cavalry division to reinforce 5th cavalry division bivouacked at Puxieau. Remainder to advance practically in three bodies:—Right Wing, Central Support and Left Wing.

Right Wing—The IIIrd Corps from Noveant *viâ* Gorze and Onville on the Metz—Verdun road. The Xth Corps from Pont-a-Mousson *viâ* Thiaucourt also on the Metz—Verdun road.

Central Support.—The above two corps to be supported by the IXth and IInd Corps.

Left Wing.—The Guard and IVth Corps to continue the march west towards the Meuse.

The movements thus ordered brought on the battle of Vionville or Rezonville. (See plate facing page 326).

PHASES OF THE BATTLE OF VIONVILLE, AUGUST 16TH.

1st Phase:—Up to 12 noon.

The cavalry reconnaissance carried out by the 5th and 6th cavalry divisions and the advance of the IIIrd Corps, the 5th division on the right and 6th on the left.

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2nd Phase:—12 noon to 2 p.m.
Mainly two cavalry actions. Charge by French Cuirassiers to support 2nd French Corps. The attempted advance by the 6th German cavalry division.

3rd Phase:—2 p.m. to 3 p.m.
Von Bredow's cavalry charge to stop advance of the 6th French Corps.

4th Phase:—3 p.m. to 5 p.m.
Fighting mainly on the German left. The advance of the left of the IIIrd Corps against the Tronville copses. The repulse of the advance and the recapture of the copses.

5th Phase:—5 p.m. to 7 p.m.
The attack by the 38th German brigade from Mars-la-Tour and its repulse. The great cavalry combat at Ville-sur-Yron.

6th Phase:—7 p.m. to 10 p.m.
The unsuccessful attempted renewal of the attack by Prince Frederick Charles.

1st Phase:—

This reconnaissance was carried out by the 5th cavalry division from Poxieux to which the 6th cavalry division, coming up from Noveant by the Gorze road, joined on. The two divisions extended in a semi-circle from the Bois de St. Arnould to the Tronville heights. This semi-circle was attacked by French troops radiating from Rezonville. The IIIrd Corps crossing at Noveant came to the assistance of the cavalry semi-circle, which was hard pressed. The Vth division eventually carried the heights south of Flavingy, but it had hard fighting; its artillery, which had been pushed forward in advance of infantry, was at one time in great danger, and was only saved by the bold action of the 52nd regiment. The VIth division captured first Vionville and then Flavigny. Thus at noon the two villages Vionville and Flavingy on the left and the wood of St. Arnould on the right marked out a front of 4 miles occupied by the IIIrd Corps, while in the second line there were only two divisions of cavalry and a regiment of infantry..

Positions of the French Corps at this time (see map):—

2nd, which had borne the brunt of the fighting, was falling back slowly on Rezonville.

6th, facing generally west, occupied Rezonville and ground to the north.

Guard was on the Gravelotte plateau.

3rd was coming up on the right of the line.

4th was following the 3rd.

Comments on the situation:—

The retreat along the Mars-la-Tour road could evidently not be carried out unless the IIIrd Corps was driven off it. It had practically no reserves, why did not Bazaine attack? Instead of doing this

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he massed the Guard Corps from Gravelotte and the 6th Corps opposite the Bois des Ognons. Clearly he was anxious to keep touch with Metz. This is an illustration of the prejudicial attraction which a fortress may exert on an army. Had there been no fortress at Metz the probability is that Bazaine on the forenoon of the 16th of August would have broken through the German intercepting force on the Metz—Verdun road.

2nd Phase; 12 noon to 2 p.m.:—

Two cavalry actions.

(i.) A charge made by the French Cuirassiers of the Guard and a Lancer regiment to re-animate the retiring 2nd Corps. This charge was repulsed and a counter charge made by two German Hussar regiments, during which Bazaine himself was nearly captured.

(ii.) An advance to the front of the 6th cavalry division on the right. This was stopped by fire from Rezonville.

3rd Phase; 2 p.m. to 3 p.m.:—

While the attacking force (IIIrd Corps) were lying exhausted with their ammunition nearly expended, the French gradually extended to their right (3rd Corps) and it was evident that the 6th Corps at Rezonville and on the ground to the north of it, was about to attack. Canrobert had in fact determined to recapture Vionville and Flavingy and had carried his attack up to the outskirts of the villages, when Alvensleben (IIIrd Corps) called upon Von Bredow, commanding a brigade of the 6th cavalry division, to charge, simply with the object of gaining time to stop the advance of the 6th Corps.

Bredow's charge:—

Made from a slight hollow to the north of Vionville towards the Roman road. Six squadrons charged and stopped the advance of the 6th Corps, but lost nearly half their numbers.

4th Phase; 3 p.m. to 5 p.m.:—

The fighting about Tronville copses:—

Meanwhile the French 3rd and 4th Corps came up on the right of the French line from the Doncourt road and advanced against the Tronville copses. The left of the IIIrd Corps, which had occupied the copses, had to fall back from the copses on Tronville village, but the artillery of the Xth Corps, which was coming up from Thiaucourt, hurried forward in advance of its infantry, reinforced the batteries of the IIIrd Corps and checked the advance of the French from the copses. The infantry advanced again, and by 5 p.m. the copses were retaken except in the extreme north border. Meanwhile on the right flank of the Germans nothing decisive had occurred. The Guard could gain no ground, and on the arrival of a brigade of the VIIIth Corps from the Moselle a strenuous effort was made to gain the heights south of Rezonville, but the attempt was defeated with heavy

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loss. The French made a counter-attack, but this also was repulsed about 5 p.m.

5th Phase; 5 p.m. to 7 p.m.:—

On the German Left:—

The French had extended their right to the sunken valley west of Bruxville. Ladmirault (4th Corps) on the extreme right had one division (De Cissey) and artillery near the farm of Greyere. The head of the 19th division of the Xth Corps (Schwarzkoppen) arrived at Mars-la-Tour, having marched from Thiaucourt to St. Hilaire on its way to the fords over the Meuse; but its commander, hearing the sound of firing, had marched towards it and so arrived at Mars-la-Tour. The O.C. Xth Corps, and also Prince Frederick Charles, both of whom had ridden up to Mars-la-Tour believed that the French right could be taken in flank from Mars-la-Tour and the 38th brigade (Wedell) was ordered to carry out the attack. The presence of De Cissey's division at Greyere farm was not known, thus the 38th brigade (only five battalions strong) found itself committed to an attack upon a whole division strongly posted behind a deep hollow. The attack failed. The brigade fell back, a shapeless crowd of fugitives. The 2nd Dragoons of the German Guard, however, charged to the help of the brigade. The dragoons suffered heavily, but their charge enabled the broken 38th brigade to draw off towards Tronville.

Great cavalry combat (see map):—

When Ladmirault (O.C. 4th Corps) advanced De Cissey's divisions to Greyere Farm, he had sent over the gully to his right towards Ville-sur-Yron:—

Legrand's Hussars and Dragoons.
De France's Lancers and Dragoons of the Guard. } 2800 men.
Du Barril's Chasseurs d'Afrique (1 regiment).

On the German side Barby's brigade of the 5th cavalry division had approached Mars-la-Tour during the attack of the 38th brigade and this was joined by the 10th Hussars, 16th Dragoons and two squadrons of the 4th Cuirassiers.—2200 men.

This force sweeping round to the north of Mars-la-Tour formed up between the Yron and the Greyere road.

The French charged in echelon, a furious confused fight ensued along the whole line, each side endeavouring to fall on the flank of the other. Then, suddenly, a squadron of the Prussion Guard Dragoons returning from a patrol came riding across country from the west and struck the flank of the French Dragoons of the Guard. This seems to have decided the combat in favour of the Germans. There were more mêlées, more charges, but finally the French cavalry wheeled about and rode out of the fight, throwing into confusion, as they fell back, a brigade of Chasseurs which had been sent to cover their retreat. Barby was able to reform and withdraw at leisure, and Ladmirault, coming to the conclusion that nothing more could be accomplished by the French right wing, went into bivouac on the hills about Greyere Farm.

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6th Phase; 7 p.m. to 10 p.m.:—

At 7 p.m. Prince Frederick Charles ordered a renewed general attack on the enemy's positions. This was a bad failure as the two German corps (IIIrd and Xth) were too exhausted to meet the demands made on them, and the fighting ceased altogether at 10 p.m. The German line of outposts ran that night along the Bois des Ognons, the Bois de St. Arnould, to the east of Flavingy and Vionville and through the Tronville copses. The French slept on the ground they held, namely, the heights south of Rezonville itself, and the ridge which overlooks the highway to Verdun as far as Bruville and Greyere.

Tactically a drawn battle.

Strategically a German victory, for the French retreat was stopped.

Numbers engaged.—Germans 60,000.
French 120,000.

Losses of each, about 16,000.

COMMENTS ON THE BATTLE OF VIONVILLE.

(1). The forming front to a flank by the IInd Army:—

In fighting the battle the German army "formed front to a flank," *i. e.*, placed itself in an admittedly disadvantageous position from a strategical point of view. In this case the danger was to some extent mitigated by the presence in rear of the IInd Army of the IIIrd German Army, upon which, if driven in, it could fall back between Nancy and Bar-le-Duc.

(2). The bold assumption of the offensive by the German subordinate leaders from the corps commanders downwards:—

When the IIIrd German Corps reached the Gorze plateau and saw the cavalry semi-circle in front being pressed back by the 2nd French Corps, it did not hesitate to attack, although it must by this time have become evident to its commander that there was a large portion of the French army in front of it. There can be little doubt that this brilliant offensive saved the IIIrd Corps. Had the German General, on arriving on the Gorze plateau, and seeing the cavalry being pressed back by superior numbers, adopted a defensive attitude, there is little doubt that the French would have come on and the IIIrd Corps would have been overwhelmed by superior force and driven down the defiles to the river. The very audacity of the attack staggered the French leaders. Another strong proof of the value of the offensive in war.

(3). The manner in which the German cavalry was employed tactically, i. e., on the actual field of battle:—

(a). To gain information. In the early morning the 5th cavalry division, which had bivouacked during the night in Puxieux and its neighbourhood, with the 6th cavalry division coming up from Gorze on

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its right, was ordered to carry out a reconnaissance in front, and the two divisions advancing on a wide arc with Rezonville as the point on which they were converging, advanced in a semi-circle extending from the Bois de St. Arnould on the right to the Tronville heights on the left.

(b). To check pursuit.

(c). To make counter charges.

(d). To stop the advance of hostile forces and gain time for hard pressed infantry.

(e). To engage and stop the advance of the enemy's cavalry.

(4). The manner in which the artillery, when it heard troops in front of it engaged, pushed forward in advance of the slower moving infantry to afford support:—

e. g. In the first phase of the battle, when the IIIrd Corps was hastening forward to support the cavalry semi-circle (5th and 6th cavalry divisions). The O.C. of artillery of the corps, General von Below ordered all the divisional artillery to hasten forward at the trot and form the centre of the attacking front. Consequently the guns were in action before the infantry could arrive, and for an appreciable interval the batteries had to depend upon themselves. But they did good service. A powerful line of guns crowned the heights which had been recently evacuated by the cavalry from Tronville as far as the Bois de Vionville, and their projectiles prepared the way for the infantry pressing forward on both wings. Again, during the fighting for the Tronville copses when the left of the IIIrd German Corps was driven out of the latter, it was the fire of twenty-four guns of the Xth Corps, which had hastened to the field across country from the direction of Thiaucourt, and had come into action before the infantry could arrive, which checked the French advance. " Nothing," says Hooper, "restrained the advancing French " infantry save the terribly effective fire of the German gunners upon " whom the brunt of the battle fell."

(5). The manner in which subordinate commanders, hearing the sound of firing at once hastened towards it, even though in so doing they were departing from other lines of advance they had been ordered to follow:—

e. g. Von Schwartzkoppen, O.C. 19th division, Xth Corps, had moved off from Thiaucourt at 7 a.m. in the direction of St. Hilaire, the direction of the march prescribed in *the general orders for the army* (being one which would bring him towards the reach of the Meuse below Verdun), and had reached St. Hilaire. But the O.C. Xth Corps, General Von Voigtz-Rhetz, becoming aware that the left wing of the IIIrd Corps was engaged, did not hesitate to send orders to the 19th division to march at once to its support.

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(6). The manner in which the attacks by the German infantry were carried out locally:—

The local attacks of the German infantry developed generally into flank attacks, *i. e.*, where the front was too strong every effort was made to attack or turn the flanks, and success was followed up until the weight of fire brought the attack to a standstill or even thrust it back. The normal formation for a Prussian battalion attacking was:—

2 companies in company column in front.

2 companies in support.

But under the stress of fire the companies further dissolved themselves into firing line, supports, and reserves.

French mistakes on the 16th August:—

1. Postponing the resumption of the retreat until the afternoon.
2. Bazaine clinging to Metz.

His action was founded on a total misappreciation of the relation of a fortress to an army in the field. Instead of treating it as a pivot of manœuvre to be relinquished when its relevancy ceased, he treated it as his actual base. If he had quitted his hold of it and strengthened his right with the successive reinforcements to his line of battle, he would have succeeded in forming front across the left of the German attack, and the close of the battle would have left him astride the roads to the Meuse facing Metz. That the enemy would be between him and Metz was of trifling import compared with their being between him and Verdun. In clinging to Metz he acted like one who, when the ship is foundering, should lay hold of an anchor.

Examination of the possibility of continuing the retreat on Verdun after the 16th August by northern routes:—

A. Reasons adduced for the belief in the possibility of this plan being carried through:—

1. The roads of Jarny and Briey were still open.
2. Two marches would take the army to Verdun.
3. Supplies of provisions and ammunition might have met them on the road.
4. The roads were full of trains on the 15th, and if, during the battle of the 16th, the supply columns had been directed on Briey, it would not have been necessary to send back to Metz for ammunition.
5. The plateau north of the battlefield permitted of retirement on a broad front, and a position beyond the Orne would have been suitable to assemble the troops and restore order.
6. It is quite clear that on the morning of the 18th the Germans were not sure of the French movements and, consequently, during the whole of the 17th the French were at liberty to execute their design unmolested.

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B. Reasons which would have rendered the issue of the attempt doubtful or would justify its non-adoption:—

1. It could scarcely be calculated upon that the Germans with their superiority would be unable to resume active operations the next day.

2. To carry off such an army as Bazaine's by a somewhat circuitous route, on few roads covered by no obstacle or defensive line, with a powerful enterprising enemy, exalted by victory, aided by a powerful and audacious cavalry with infantry capable of marching twenty miles a day and of greatly superior numbers, on the flank of the lengthened columns must always be an operation full of risk.

3. The Germans were in possession of a road to Verdun shorter than those by which the French would have to move, thus rendering the position one in which the catastrophe is only postponed by the existence of such lines of retreat in rear of an army which has been forced to form front to a flank.

4. The French intendance was unequal to its duties, and the staff had shown weakness and want of ability to carry out a difficult movement.

Bazaine's own justification of the course he adopted was that in Metz he had a strong post on the flank of the German communications, and that if he could make his adversaries waste their troops in repeated attacks upon "inexpugnable" positions, he might be able to resume the offensive when the army of Chalons took the field. Probably he really did not believe that the morale of his army was sufficiently good to enable him to undertake the enterprise with any hope of success.

MOVEMENTS ORDERED BY VON MOLTKE ON THE 17TH AUGUST FOR THE 18TH AND WHICH BROUGHT ON THE BATTLE OF GRAVELOTTE.

General idea:—

The IInd Army to march north in direct echelon of corps from the left.

The Ist Army to detail two corps (VIIth and VIIIth) to cover the movements from any attack from Metz.

If the French army was found to be retreating by the northern roads the *left wing* of the IInd Army would attack it while the *right wing* would move up to support the left.

If the French army was in position west of Metz the *left wing* would swing round eastward and envelope any position taken up and the *right wing* would wheel to the right for a frontal attack.

The VIIth Corps would in this case form the pivot on which the whole army would wheel to the right.

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THE FRENCH POSITION AT GRAVELOTTE.

(See plate facing page 326).

Extent:—

Roncourt—Rozereuilles. Seven miles along the crest of an open ridge.

Character of front slope:—

West slopes fell gently.
Like glacis on right.
Steep and wooded on left.
The ridge lay between two ravines, both becoming gradually shallower as they approached the right.

Strength:—

Left naturally strong, supported by forts Plappeville and Queleu.

Centre strong from the lie of the ground and strongly built farmhouses.

Right weak both by nature and position, being *en l'air.*

Weakness:—

Woods running up to the occupied line from the ravine in front. Steep wooded ravine in rear, rendering the forwarding of reinforcements difficult.

German movements on the 18th of August:—

The movement ordered was begun early, but some delay was caused by the Guard not being in position, but by 9 a.m. the following positions had been reached.

XIIth.—Jarny.
Guard.—Between Mars-la-Tour and Roncourt.
IXth.—Caulre Farm, N.E. of St. Marcel.
Xth.—Tronville.
IIIrd.—Vionville.
VIIIth.—Rezonville.
VIIth.—South of Gravelotte.

It now became evident that the French army was still in the vicinity of Metz, but it was believed that its right wing did not extend further north than Montigny.

The IInd Army was, therefore, ordered to attack the French right with the artillery of the IXth Corps, while the Guard and XIIth made an enveloping movement. The mistake was discovered and the following orders issued:—

IXth to postpone its attack.
Guard to march on Amanvillers.
XIIth to march on St. Marie aux Chenes.
The Ist Army not to attack until the IInd was in position.

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12 noon to 5 p.m.—Attack of IXth Corps from Verneville towards Amanvillers:—

Mannstein's (IXth) Corps seeing the French lying unconcerned in their camp, brought his artillery into action on a spur between Amanvillers and Verneville. This brought the whole French line to arms. The infantry of the IXth Corps had to be pushed forward to support the artillery, ultimately the whole IXth Corps was at 2 p.m. deployed on a line 2½ miles long, extending from the Bois de Genivaux to Habonville.

Attempts to advance were checked with heavy loss and the position of the IXth Corps became very grave. Six batteries of the IIIrd Corps came to its assistance, and by 5 p.m. the pressing danger was over as the Guard was making its presence felt on the left. 105 guns were in action in front of Verneville and up to Habonville. For some time there was a total cessation of fighting here.

2 p.m. to 5 p.m.—Attack by the Ist Army on the French left (see map):—

The Ist German Army was not to attack until the IInd Army had developed its attack. Steinmetz wished to press on, but Moltke gave him strict orders to stand still. Permission was, however, given him to use his artillery, and thus sixteen batteries of the VIIth and VIIIth were brought into action north and south of Gravelotte. But the expectant attitude of the Ist Army was not long maintained. The G.O.C. VIIIth Corps seeing the IXth deeply engaged on their left, obtained permission from Steinmetz to attack. Descending the steep ravine to the Mance the Germans worked their way up the opposite slopes. About 3 p.m. they seized St. Hubert and the quarries and a brigade of the VIIth seized Jussy. But beyond this the Germans could not advance and, the French advancing, the Germans were driven back to the edge of the woods, though St. Hubert was still held. At 5 p.m. there was a lull in the fighting here, the troops on both sides being exhausted.

Movements of the Guard and XIIth Corps (left wing of IInd Army).—The attack on St. Privat:—

The leading artillery of the Guard Corps had come into action at Habonville to support the IXth. The main body of Guard reached St. Ail at 2 p.m. It was now seen that the French right extended to Roncourt, and that St. Marie-aux-Chenes was held. The Guard, therefore, were ordered to wait for the movements of the XIIth Corps to be developed and detached one division towards St. Marie-aux-Chenes.

Turning movement on Roncourt ordered for XIIth Corps:—

The XIIth, moving east from Jarny, had arrived at Batilly en route for St. Marie, when they heard at 2 p.m. that the French right was at Roncourt, so the O.C. sent one division (23rd) to move down the right bank of the Orne, through Auboue and turn the right upon

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Roncourt. One brigade of the 24th he ordered to advance on St. Marie, and the other to remain in reserve. The division of the Guard and the brigade of the XIIth captured St. Marie at 3.30 p.m. The artillery of the Guard now advanced to a position in front of Habonville and St. Ail. The artillery of the XIIth were on a ridge north of St. Marie. Of the Guard Corps, one division deployed facing St. Marie. One brigade of the other division remained in support, the other reinforced the IXth Corps. It was intended that the Guard should remain quiescent until the turning movement by the XIIth had been developed. The O.C. Guard Corps, however, thought from certain movements that the turning column was more advanced. The day was waning. The IXth still unable to advance. He therefore sought, and obtained from, Prince Frederick Charles permission to attack St. Privat. About 7 p.m. the attack was brought to a standstill about 600 paces from the village and the Guard was unable to advance or retire. Relief to the Guard came with the approach of the turning column (XIIth Corps). This concentrated its artillery on Roncourt and attacked both from north and west. Canrobert (6th Corps), afraid of being enveloped, withdrew. The XIIth continued its advance on St. Privat and the last reserve of the Guard was again pushed forward, but artillery came up from Xth Corps, and at 8 p.m. St. Privat surrendered. The 6th Corps fell back into the valley of the Moselle. Reserves sent, too late, by Bazaine from his left came up to Amanvillers and stopped any further German advance, an artillery duel being maintained till nightfall. In the early morning the whole position was evacuated by the French. Meanwhile on the German right the IInd Corps had come up from Pont-a-Musson.

Last attack by Ist Army and IInd Corps on French left:—

About 6 p.m. the King ordered Steinmetz to make a renewed attack with all the troops at his disposal. Bazaine reinforcing his left with a division of the Guard made a counter-attack, and the attack mainly carried out by the IInd Corps was repulsed. Darkness coming on the order was issued to stop the fighting, and the exhausted troops of both sides remained in close proximity waiting for the morning to resume the fight.

During the night of the 18th August the French corps were ordered to occupy positions under the guns of Metz, and by the forenoon of the 19th had gained its shelter. Meanwhile, the army of MacMahon, which had been defeated at Woerth, had regained Chalons by southern routes where it was joined by the 12th Corps; but hearing that German scouts were only 25 miles distant, MacMahon ordered a retirement on Reims.

The Army of the Meuse:—

The Germans determined to invest Metz, and for this purpose detached seven corps of the Ist and IInd armies under Prince Frederick Charles. The remaining corps, *i. e.*, the Guard, IVth and XIIth, with the 5th and 6th cavalry divisions, were formed into the "Army of the Meuse," under the Crown Prince of Saxony, and with this army, co-operating with the IIIrd, it was intended to attack the French army at Chalons and march on to Paris.

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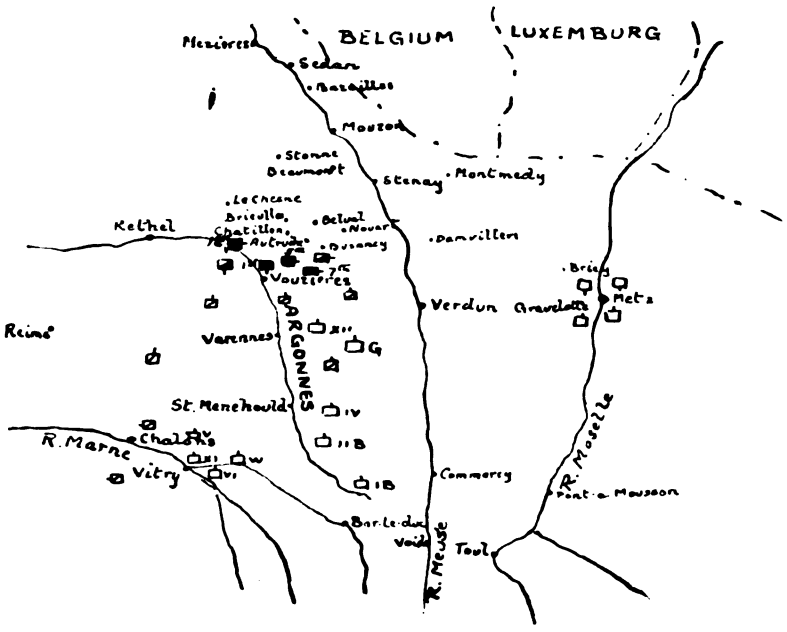
On the 20th August the new army was moving on the line Commercy—Briey towards Verdun, and on the 22nd the Uhlans of the Guard were over the Meuse. At the same time the IIIrd Army (Crown Prince of Prussia) had crossed the river at Void.

French movements:—

On the 22nd of August MacMahon received an ambiguous telegram from Bazaine, which led him to believe that Bazaine was already marching on Montmedy, and that evening orders were issued for an advance next day to that place. On his retirement from Chalons, MacMahon had left no troops there to deceive the Germans of his intentions, but on quitting Reims on the 23rd he had asked the War Minister to send a division of the newly-formed 13th Corps to hold Chalons as a base of supply. No cavalry was sent to the south-east to cover MacMahon's march, and he was entirely in the dark as to the movements of the Germans, except for such scraps of information as were sent him by the municipal authorities. The army of MacMahon arrived east of Rethel on the 26th, after marching and counter-marching until the troops were exhausted.

POSITIONS ON AUGUST 26TH.



On the 27th of August the French cavalry met that of the Germans at Buzancy, but no infantry were encountered. Nevertheless MacMahon ordered a retirement on Chatillon and Brieulles, on the report that the IIIrd German Army was at St. Menehould and another near Varennes, hoping to regain Paris *vid* Mezieres, unless

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he heard that Bazaine had left Metz. On the previous day he had learnt for certain that Bazaine was still there. This movement evoked a furious storm in Paris, and the War Minister telegraphed to MacMahon to attack the Crown Prince, urging the imminence of a revolution in the capital if Bazaine were abandoned. This caused MacMahon to issue orders for an advance on Montmedy.

Comments:—

Had MacMahon attacked the Crown Prince of Saxony's army on the 28th near Nouart he might have gained a small advantage over it before it could be reinforced by the IIIrd Army. In the event of failure he would at least have learnt the hopelessness of attempting to relieve Bazaine. On the evening of the 28th MacMahon learnt that the IIIrd Army was marching on St. Menehould, and that Stenay was held and the bridge there broken. Acting on this he determined to use the roads along the Belgian frontier *viâ* Mouzon for his march to Montmedy, but instead of making a long and rapid march, all he did was to advance about fourteen miles. In doing which he ran considerable risk of finding the Germans before him at Montmedy, or allowing them to penetrate between him and Paris. A safer course would have been to force the passage of the river at Stenay.

On the 29th there were sharp skirmishes with the Germans, and on the 30th the 5th Corps (De Failly) was driven out of Beaumont in confusion. This decided MacMahon to retire west, and at 8 p.m. he issued orders for a retirement to Sedan. On the 31st there was sharp fighting at Bazeilles, but the Germans were driven back across the Meuse, and the French army encamped round Sedan.

German movements:—

As early as the 19th of August the German 4th cavalry division (IIIrd Army) had reported that Chalons was held by a large force. In the morning of the same day the Crown Prince received information that an indecisive action had been fought at Gravelotte, and was opinion that he should retire one march and concentrate. His chief of staff (Blumenthal), however, persuaded him to continue the advance. In doing this he was rendering the best assistance to the Ist and IInd Armies investing Bazaine, since such a movement would bring him astride the latter's communications. This day a brigade of the IInd Bavarians was detached to blockade Toul. On the 20th of August the Crown Prince had an interview with Moltke at Pont-a-Musson, when he received instructions to co-operate with the newly-formed Army of the Meuse (Guard, IVth and XIIth Corps) in attacking the French at Chalons and subsequently marching on Paris. He was to wait on the Meuse, however, until the Meuse army came up, only keeping contact with the enemy by means of his cavalry.

On the 22nd August, acting on information received, the IIIrd and Meuse Armies received orders for a march next day to attack the French at Verdun or Chalons with the object of forcing them

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away from Paris to the north. The order of march was roughly echelon from the left, the IIIrd Army being one day ahead of the Meuse Army, this being the best formation for the object in view if the French were found on the direct line to Paris.

On the 23rd August the German cavalry found Chalons camp evacuated; they were then directed up the Marne to discover the direction of the French march, and they learnt that 150,000 men were at Reims.

On the 24th the XIIth Corps made an unsuccessful attack on Verdun.

It is worthy of note that the German cavalry were not sent across the Argonnes to reconnoitre.

On the 25th Moltke issued the following order:—

"The enemy has left Chalons and is marching to Reims. The "Meuse and IIIrd Armies will, therefore, advance north-west. Cav- "alry will be pushed well forward and will pass Vouzierres and "Buzancy."

Moltke planned that if the French retired from Reims on Paris he would follow with his right on Reims and left on Arcis-sur-Aube; if it became necessary to march north he would attack MacMahon near Damvillers with the Meuse Army, concentrated on its right, supported by the IIIrd Army.

On the 26th of August the cavalry regained touch with the enemy east of Vouzieres and in Reims.

Such information as came to hand shewed that the French, 110,000 strong, were moving north and north-east from Reims, and orders were issued at noon for the Meuse army and the Ist and IInd Bavarians to march on Vouzieres, and it was believed that MacMahon was concentrated there, and the IInd Army was directed to send two corps to Damvillers, temporarily abandoning the blockade east of Metz. The IIIrd Army was directed on St. Menehould.

At 11 p.m. news was brought that MacMahon was marching on Metz, and orders were issued for the Meuse Army to march on Damvilleres and secure the passage over the river, this latter was done by the XIIth on the 27th.

Moltke now considered that he had sufficient force to cope with the French on the left bank of the Meuse, and so cancelled his orders for co-operation by the IInd Army. On the 28th the German forces continued their northward march. On the Guard cavalry reporting that the French were marching north from Beaumont and advancing east of Autruche, Moltke concluded that they were pursuing their advance towards the Meuse, and if he continued to march in echelon, the French would meet only half his force, so he moved the IIIrd Army into line with the Meuse army, hoping to strike them in flank and drive them into Belgium if they continued east.

On the 29th August news was brought that two or three French Corps were between Belval and St. Pierremont, that Beaumont was held and some troops had crossed the river.

Moltke, therefore, assumed that the whole French army was moving north-east towards the Meuse and would be next day between

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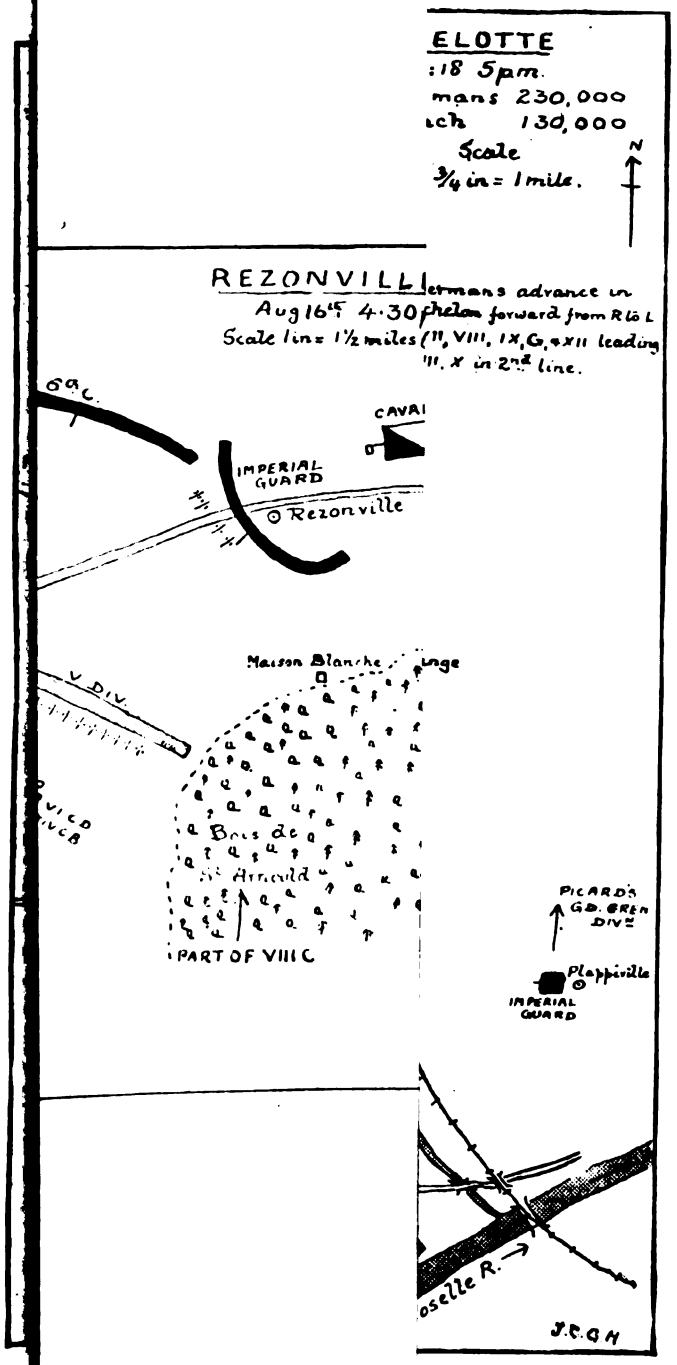

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Le Chesne and Beaumont, so he issued orders for an attack before they could all cross the river.

On the 30th the IVth Corps surprised the 5th French Corps in camp near Beaumont and drove them out. The IIIrd Army marched in the direction of Stonne, finding the enemy apparently in force there, but no attack was made for fear that the French would retire precipitately. The French evacuated Stonne, and the Royal Head quarters, now at Buzancy, issued orders for the attack of all French troops on the left bank of the river, with the object of hemming them between it and the Belgian frontier. The Meuse Army was to check any movement of the French left to the east. The order concluded:

"If the enemy enters Belgian territory he will be followed unless "immediately disarmed."

And Moltke wired to the German Minister in Brussels to this effect.

Early on the morning of the 31st the Germans learnt that Mouzon had been abandoned by the French, who were retiring on Carignan and Sedan. The Ist Bavarians attacked Bazeilles but were driven across the Meuse again.

On the evening of the 31st accurate information was to hand that the whole French Army was grouped round Sedan.

(To be continued).

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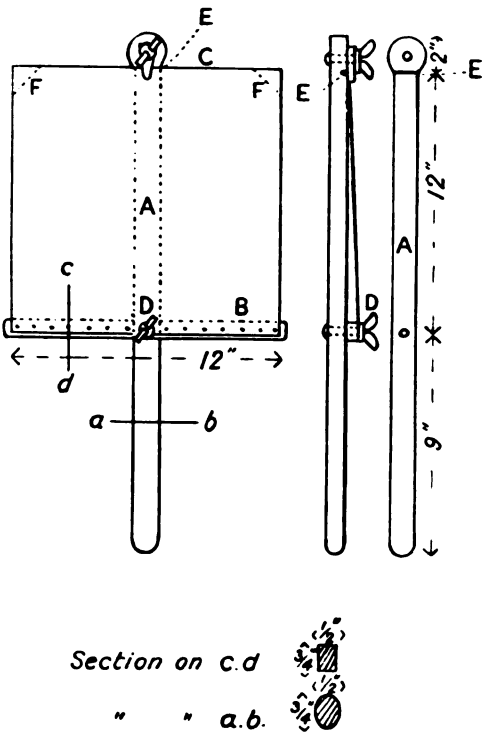
An Improved Semaphore Flag.

By LIEUT. J. K. L. FITZWILLIAMS, R.F.A.

In view of the difficulty of reading semaphore signals, when the flag insists on curling itself round the pole, as so often happens in wet and windy weather, it is suggested that a flag such as that described below would be an improvement on the small Morse flag now generally used.

Description:—

The pole A, to which a wooden cross piece B is fixed by means of a butterfly nut D. The flag is nailed along its lower end to the cross piece B. Through a runner at its upper end is passed a rod *c*, three-six-sixteenths of an inch in diameter, fixed at each end by leather corners F. In the pole A a groove is cut at E to receive the rod C, which is clamped to it by a nut.



To set up the flag:—

Place the cross piece B at right angles to the pole A and clamp the nut D. Place the rod *c* in the groove E and clamp. The flag is now ready for use, and however strong the wind may be, will always remain open.

To take down the flag:—

Loosen the nut E and take the rod *c* out of the groove. Loosen the nut D and turn the cross piece B round along the pole A. Fold the flag round the pole and cross piece and fasten with a tape attached to the flag.

The advantages of this flag over the present one in use are:—

1. It can be easier read.
2. It can be read at almost double the distance.

The dimensions shown on sketch are considered the most suitable for battery use.

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A Journey from Sierra Leone to Algeria across the Sahara.

By CAPTAIN A. H W. HAYWOOD, R.A.

I had been serving on the West Coast of Africa at Sierra Leone and was entitled to six months leave at the end of 1909. The River Niger has always had a great attraction for me, so I determined to spend my holiday in exploring it and shooting big game in its basin. Instead of returning to England by West Africa I decided to strike across the Sahara Desert from the vicinity of Timbuctu and make for Algiers. I calculated this latter portion of my journey would not take much longer and at the same time it would give me an opportunity I had long desired of seeing the little known Sahara Desert, and ascertaining for myself the truth of the many curious stories of that wild region and the strange nomad tribes who live in it.

Having obtained the necessary permission of the authorities I set out from Freetown on the 6th January, taking a Sierra Leone "boy" as my servant cook. My armament consisted of a ·450 Cordite Express, a ·303 Magazine Sporting Rifle, and a 12-bore shot gun. I was well provided with ammunition and had a five months supply of such necessary articles as tea, cocoa, flour, jam, and some tinned meats.

The first 200 miles of my journey lay along the Sierra Leone railway, taking me to Pendembu, on the eastern frontier of the British Protectorate. Here I organized my caravan of carriers, numbering fourteen. On January 9th we began our march northwards through the mountainous country along the Liberian border, heading for the Tembikunda Range, in which is the source of the Niger River. Along this frontier there is a good deal of grass country, the favourite haunts of bushcow, which afford capital sport. The grass was unburnt when I passed, I therefore hardly got as good sport as I might have done later, for these beasts charge and are difficult to tackle in long grass, in which they are easily concealed.

I arrived within three miles of the source of the Niger on January 17th; unfortunately I was suffering from blood poisoning in the knee at the time and was unable to actually see the spot, for this would have entailed an arduous climb up rugged pathless moun-

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tains. Crossing the frontier next day into French Guinea I followed the Niger, here only some ten yards wide, to Faranah, a fairly big administrative centre, where I stayed two days with the district commissioner. Proceeding thence down the Niger by road I made a halt on the Mafou River where I had some capital sport with kob and waterbuck. This is a fine shooting ground where good heads can be obtained. Elephant were reported in this vicinity, but I only came across old tracks.

On January 25th I reached Kouroussa, interesting as being the proposed terminus of the French Guinea railway from Konakry. The line had not yet reached here, but will probably do so by the end of the current year. At Kouroussa the Niger is 200 yards wide and commences to be navigable. During the rainy season fair sized barges can get down river to Bamako, the capital of the French Soudan, a distance of 200 miles. I was now entering the rubber country. Guinea rubber is the produce of the rubber vine which grows in profusion on the east of the Niger, and between it and the Ivory Coast Colony. I now left the Niger, striking into the "bush" country eastwards for some elephant shooting on the Sankarani River. On my departure from Kouroussa, my boy, who had promised to accompany me to Algiers, ran away. He probably came to the conclusion that the task was more difficult than he had bargained for, hence his desertion. The district commissioner very kindly procured me a local native who accompanied me to Timbuctu. My route lay through Kankan, a large and important rubber market of some 12,000 inhabitants.

The weather was now getting very hot and the country more open, making marching by day more trying. My carriers were not good. The Sierra Leone Mendi native is a far better porter. In French Guinea a carrier grumbles at a load of 40 lbs., which would be a mere bagatelle for a Mendi. A further inconvenience of these carriers is that they have to be changed each time one arrives in a fresh district; *e. g.*, every four or five days. I spent two weeks in the Wasulu country getting some fine West African haartebeeste and kob, but the elephant were not very large tuskers. A smaller elephant of a reddish grey tinge inhabits this country. He is probably more savage than the ordinary West African elephant, but his ivory is too small to be a good trophy. As far as I know this beast is not found in any other part of Africa. This region is thinly populated and for that reason a favourite haunt of wild animals. It was devastated by the great native chief, Samory, from 1882 to 1897, who with an army of 40,000 men overran the greater portion of French West Africa, and inflicted some severe reverses on our continental friends. Ruins of old towns destroyed by his Sofas are frequently seen in the "bush." There are many native hunters in the neighbourhood, and most of the existing villages have strong superstitious beliefs connected with the chase. Outside a hunting village will always be found a large monument of antelope horns, skins, teeth of wild beasts and other trophies. This kind of alter is a strong " juju," and, as such, held in great awe by the inhabitants.

From Wasulu I bent my steps north again intending to strike

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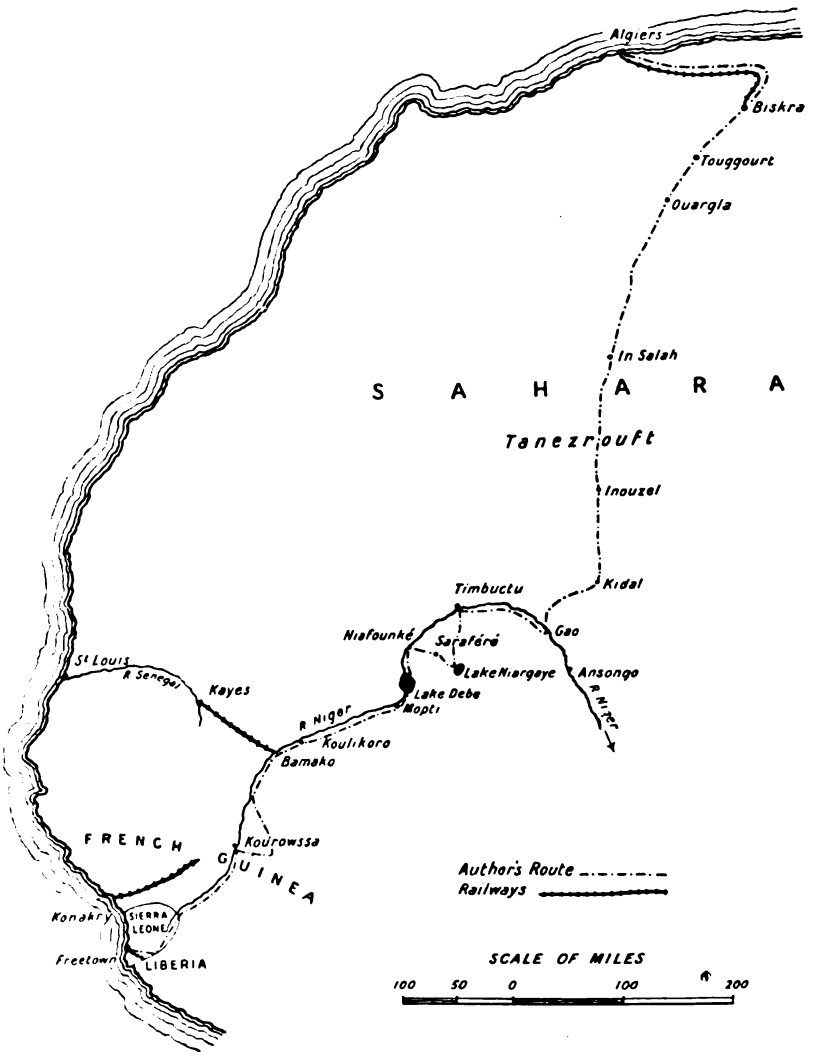
the Niger south of Bamako. This entailed a march of eight days through the "bush," in a country rich in millet. Alluvial gold is also found here, I often saw natives washing it out of the sand in the bed of the rivers, which here are all tributaries of the Niger in the Siguiri district. Siguiri itself is the centre of the gold mining district of Buré. Several European Companies have mining concessions here, but they do not appear to be of much value.

MAP TO ILLUSTRATE
JOURNEY FROM FREETOWN TO ALGIERS.



Bamako was reached on February 24th. It is a fine place, planned on the model of a French town, with broad streets and

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beautiful boulevards. There are a number of European commercial houses, a hotel and railway station, &c. The railway is the Senegal-Niger line, running from Kayes, the highest navigable point of the Senegal River. From Kayes this river is more or less practicable for steamers to the sea at St. Louis. The volume of water in the Senegal River varies greatly according to the season. From July to October there is plenty of water, steamers of 2000 tons can ascend from St. Louis to Kayes, and the voyage takes only four or five days. But in the dry season, particularly from February to May, a very different state of affairs exists, water being extremely scarce. Only very light draught boats, such as "dug-out" canoes, can navigate the river, and the journey from St. Louis to Kayes takes three or four weeks. At Bamako the Lieutenant Governor of the colony resides. His residence is on a hill, called Koubouba, commanding a beautiful view over the Niger for many miles. I had walked all the way from Sierra Leone to Bamako; I therefore much appreciated a rest of four days there.

On February 27th I left by train for Koulikoro; this is the terminus of the railway. It is 36 miles from Bamako and on the Niger. At this point the river becomes uninterruptedly navigable as far as Ansongo, a distance of 900 miles. The rapids of Sotuba and Kiénétala hinder navigation on the section Bamako—Koulikoro, hence the need for the railway. All the country produces a quantity of rice and millet which grows on the land inundated by the Niger.

On March 1st, I embarked at Koulikoro on a small river launch which had a comfortable cabin in which I installed myself. Crocodiles abound in this part of the river, and it is excellent practice to fire at them from the boat as they lie basking in the sun on sand-banks. These little boats travel about 6 knots an hour, but do not steam by night. It is the usual practice to anchor at a favourable spot on the river bank before sunset. One can then stretch one's legs and at the same time have some excellent sport with the duck and geese which are seen here in hundreds. We arrived at an interesting spot called Mopti on March 7th. This is at the confluence of the rivers Niger and Bani. All the country enclosed between them for an area of 5000 square miles is inundated, and one vast rice plantation. The rice is largely exported and practically feeds all Senegal Colony as well as the local population.

On March 10th I disembarked at Niafounké, 450 miles below Bamako. Here I engaged eight carriers, and, taking one month's supply of stores, started off on a hunting trip into the bend of the Niger, South of Timbuctu. Horses are plentiful in these parts. A very useful animal is bred in the Bandiagara district, 70 or 80 miles south-west of Mopti. Moderate beasts can be picked up for a mere song; I bought a 14·2 pony for sixty francs; he was a most indefatigable little animal. During my hunting trips in this country he used to carry me 25 to 30 miles daily for a month without being any the worse; he was satisfied with what he could find in the way of food on the route and required but little water; he was eventually sold at an auction at Timbuctu for 40 francs.

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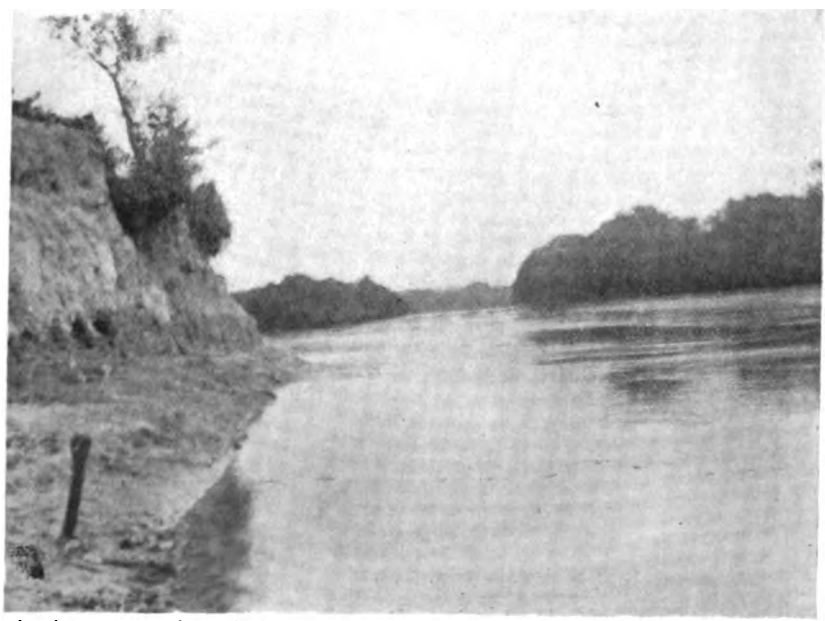
A village of French Guinea.



A picturesque view of the River Niger at Faranah, some 70 miles below its source. Here it is only 60 yards wide and fordable.

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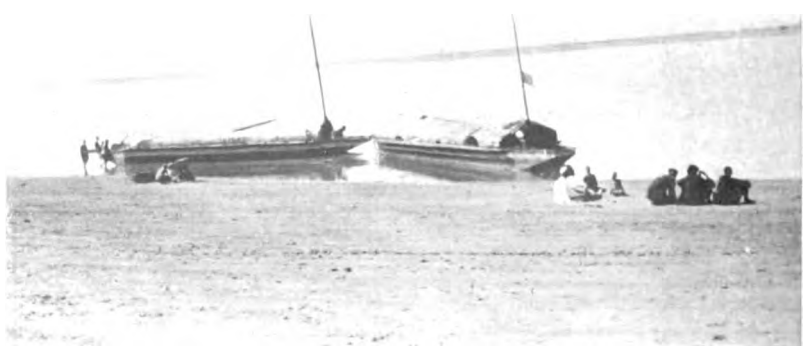
The Railway station and hotel at Bamako, French Soudan.



Steel lighters used on the Niger. They can be poled or towed and with a crew of six men cover 30 to 40 miles per day in normal weather. At Sansanding, French Soudan.

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Sport in this region is excellent; lion abound, elephant are certain to be met with in the lake district, and Senegal haartebeeste are numerous. Besides these, panther, and almost every variety of West African antelope are to be shot. Here again I was unfortunate in not finding good tuskers. The country is generally sandy, and trees are not large. The consequence is that elephants do not require big tusks to cope with the small roots and branches which exist, and it would appear that their ivory has degenerated. In addition to this, the surface of the soil is often rocky and the tusks get broken. French sportsmen told me that it is extremely rare to get an elephant with tusks over 50 lbs.

I had intended to make due north by road for Timbuctu; but the season was hot, wells were scarce, and I could not get a guide to take me. I was, therefore, obliged to go to Kabara, the port of Timbuctu, by canoe along small waterways and tributaries of the Niger. Kabara itself is 5 miles from Timbuctu, the latter not being on the river. The country was now virtually the desert. Timbuctu is surrounded by a vast stretch of sand as far as the eye can reach. Vegetation is practically non-existent.

Timbuctu, often called the mysterious, is an ancient town, and was formerly the capital of the influential Sonrhay people. Their Empire extended over a large portion of the Central Niger basin until the end of the fifteenth century. About that period the Moors made a descent from Southern Morocco, captured Timbuctu, and drove out the Sonrhays, who took refuge in the country south of the bend of the Niger. The Moors were themselves expelled by the Tuaregs about the sixteenth century. The latter held Timbuctu undisputedly until the French came on the scene towards the end of last century. The Tuaregs made the town a stronghold, from which they issued forth periodically for their piratical excursions to the desert. All traders and wayfarers in these regions lived in deadly fear of their lives and property. The French, after some desperate encounters, captured Timbuctu, gradually restoring law and order to this wild part of Africa. Most of the ancient buildings have been buried in the sand which is constantly drifting up under the influence of the north-east desert winds. A portion of the old town still remains, however, forming a picturesque scene with its quaint narrow streets and mud houses, the tops of which nearly touch, forming an archway overhead. The oldest buildings of the town are the mosques. There are three of these, the oldest was built in 1482 by the Moors. Most of the older buildings show signs of Moorish design. The houses are built in the form of a hollow square, with an inner and outer courtyard, on entering the guest is shown into the outer court-yard, where the male portion of the family have their meals. The inner yard is reserved for slaves and the female members; the father eats first, the sons not being allowed to take any food until their father has finished.

The importance of Timbuctu is more historical than practical. The only trade of the place is salt, and a little gum arabic. The former is brought in periodically by camel caravans from the desert

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mines of Taudény, some 350 miles north-west of the town. Except for its geographical position, near the top of the most northerly bend of the Niger, it does not appear that Timbuctu is worth holding. Indeed, even this geographical factor is of doubtful value, for, although by reason of this position, it is the nearest point to Algeria, yet the route thence across the desert is a difficult one; water is very scarce; in one place there are ten days march between wells.

There are more convenient and practical routes across the Sahara, emanating from Bamba, Bourem and Gao, further down the Niger.

Leaving Timbuctu on April 12th, I hired a barge to take me down the river to Gao. This section of the Niger is an interesting one. The river widens out to 3 miles and more, large stretches are inundated, chiefly on the right bank, forming a splendid rice growing ground. Giraffe are fairly numerous on the left bank, but these animals are very shy making them difficult to approach. I found the best way of hunting them was to pursue them on a good strong pony; after a bit one wears them down, and is able to approach them within practicable range. Their colour assimilates well with the surrounding sand and mimosa scrub on which they feed. Often knowing a giraffe is in the vicinity one gazes for quite an appreciable time before spying the graceful creature's long neck, half concealed, as he feeds, near the top of a mimosa tree. At Tosaye the river narrows to some 500 yards and rushes through a rocky defile with a current of 7 or 8 knots. Gao is 1400 miles from the source of the Niger. I spent a few days here organizing my caravan for the desert march. The French officials at this post were most hospitable and kind to me during my stay.

I started with one riding and four baggage camels from Gao on April 23rd. I had a native boy, two guides, and a small escort of French "Senegalese tirailleurs," who were to accompany me to Kidal, the last French post in West African Sahara, 280 miles north of Gao. The heat was now very great, my thermometer registered as much as 110° in the shade on the average, consequently I marched as much as possible at night. The nights were also very cold; there was often a drop of 50° between midday and midnight. In spite of the strictest precautions it was difficult to prevent a chill, with the certain result of an attack of fever. My camels were not good ones. Camels from the riverside are never so enduring as those obtained in the heart of the desert. The former are used to drink every two or three days, and cannot exist longer than this without water. Desert camels can go seven or eight days without drinking in the dry season, and as much as ten days in the cool season.

We reached Kidal on May 5th. There are two wells of excellent water here and a few date palms. The country is very hilly. Kidal itself is some 1800 feet above sea level, in the south of the Adrar plateau. Adrar is a favoured district in comparison with the rest of the desert by which it is surrounded. Oueds, or dried up water courses, with pasturage for camels, are fairly frequent. The

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My Arab guide from Gao.
A venerable looking old man but whose looks somewhat belie his true character.

Fulani tribesmen talking to Tuaregs and discussing the price of a bullock. The man sitting down carries two native spears—the national arm. At Bamhara, Lake Niangaye.

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A view of the mysterious town of Timbuctu, taken from the top of one of its Mosques.

A Tuareg encampment in the desert. Inouzel.
Their shelters are very primitive and consist of a few sticks with goat skins tied over them.

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Saharan vegetation on which camels feed is of many varities, in the form of coarse grass, or sometimes in the nature of a shrub, but always with some kind of thorn on it. Camels will eat almost any kind of herb in the Sahara, but they require humouring, as when a beast is roughly handled he will sometimes sulk, refusing to eat purely for this reason.

At Kidal I obtained fresh camels and a fresh guide. My caravan consisted of four men; myself, the guide, his "Sokrar" or camel driver, and my servant. I had five camels and my guide had three.

We now had the worst part of the desert in front of us, a bleak, desolate waste called the Tanezrouft, must be crossed. Many marches were three and four days between wells, and the Tanezrouft consisted of a 200 miles long waterless tract, taking seven days to cross. We reckoned to be five weeks before reaching our next point, the Oasis of Insalah. On this section of the journey I had my most trying experiences. Sandstorms were most frequent and severe. The heat was at times most intolerable during the day, water was bad and scarce, and my food consisted mostly of dates—a diet of which one soon tires. Crossing the Tanezrouft we had to march night and day, about eighteen hours out of the twenty-four, in order to reach the wells on the north side before our water supply was exhausted. There was but little time for sleep and we were all overcome by fatigue. My guide, Mahomed, had an anxious time in keeping his right direction. A mistake at this stage might easily have caused us to lose the way, lose the well, and probably lose our lives. Poor fellow, he had not much chance of any sleep. Myself I found sleeping on a camel impossible; once or twice I found myself beginning to doze, and in consequence slipping from the saddle. A drop from this height on to the hard sand or rock would have meant a serious injury, I thus found it more prudent to keep awake by dismounting and walking. I had to discard a good deal of baggage, for my camels became very exhausted towards the end of the Tanezrouft, and would have dropped unless relieved of much of their loads. At last this horrible, inhospitable desert was finished. From here to Insalah there still remained twelve days of hard marching, but the country was comparatively easy, wells were never more than three days apart, and the general relief from the strain of the past week was great.

On June 12th I reached Insalah. This is a French post occupied by camel corps troops, about in the centre of the Sahara. The oasis is a large date palm grove. Water is found near the surface, and is led by small ditches, called "Foggaras," to the palms, the roots of which it irrigates. I had a two days halt here to reorganize my caravan. I engaged a fresh guide and reduced my camels to three. My servant, Musa, was afraid of being taken into slavery in Algeria, where the Arabs have, or had, a great reputation as slave drivers, so I left him behind to be sent to his country on the Niger when a suitable occasion offered.

After fifteen days marching, nearly due north, through a very sandy, barren region, I reached the large date oasis of Ouargla. The

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best desert dates come from here, being sent by caravan to Biskra, whence they are exported to Europe.

On July 5th I reached Touggourt, another considerable oasis. From here there is a coach running to Biskra, a distance of 125 miles, through the desert. I arrived at Biskra July 7th, having covered 1600 miles from Gao, and 625 from Insalah. Here I was in civilization and had the railway to Algiers.

The total length of my journey through Africa, from Freetown to Algiers, was close on 3800 miles. I then travelled *viâ* Marseilles and Calais to England, reaching London on the 12th July.

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Effects on Coast Defence of the Naval Developments of the last few years.

By MAJOR C. R. BUCKLE, D.S.O., R.G.A.

BEFORE discussing the effects on coast defence of the naval developments of the last few years we must first consider what these developments have been. They may be placed under the following headings:—

A. Increase in the number of heavy guns carried by battleships with a corresponding increase in the amount of ammunition.

B. The prolongation of the life of the rifling of the guns.

C. Increase in the size of ships, giving increased armament, speed, and protection.

D. The adoption of guns and mountings admitting of guns being fired at longer ranges.

E. Wireless telegraphy.

F. Increase in the size of torpedo craft.

G. Increase in the range of torpedoes.

H. Submarines.

I. Improvements in naval gunnery.

A AND B.

The increase in the number of heavy guns and in the number of rounds of ammunition carried by each ship combined with the prolongation of the life of guns can be conveniently considered together as factors which increase the probability of warships undertaking the operation of bombarding a dockyard.

In the days of the "4 heavy gun" ships, a fleet of six battleships carried twenty-four heavy guns, and if for the sake of argument we allow 100 rounds of ammunition for each gun, 2400 rounds of heavy gun ammunition. A fleet of six battleships of the present day type, each ship mounting, let us say, ten heavy guns, carries sixty heavy guns and 6000 rounds of heavy gun ammunition. Let us again for sake of argument assume that it requires an expenditure of 1000 rounds of heavy gun ammunition to destroy the workshops and dry docks in a dockyard, and to render ineffective the warships which are

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undergoing refit at the time of the bombardment. On the conclusion of the operation, the "4 heavy gun" fleet will have fired forty-two rounds per gun and will have 1400 rounds remaining in the fleet; the "10 heavy gun" fleet will have fired seventeen rounds per gun and will have 5000 rounds remaining in the fleet.

It is true that a fleet with full magazines meeting one which has previously expended seventeen rounds per gun has the advantage, but not nearly to the same extent as when it meets a fleet which has expended forty-two rounds per gun of its ammunition.

The increase in the number of guns in a ship also enables a fleet to accomplish the destruction of a dockyard in a shorter space of time than heretofore, and, therefore, exposes the attacking ships to the fire of the shore batteries for a shorter period.

Every round fired from a heavy gun causes erosion in the bore and, therefore, tends to decrease its accuracy; consequently, if a fleet expends a large number of rounds per gun in the bombardment of a dockyard, it is at a great disadvantage as regards its shooting powers when it meets a fleet of equal armament and speed which has comparatively speaking new guns. So much so is this the case that a ship after heavy fighting may require to renew her gun supply as well as coal and ammunition. This being so, the bombardment of a dockyard with a fleet composed of "4 heavy gun" ships was quite out of the question until command of the sea had been obtained.

In recent years, concurrently with the large increase in the number of guns carried by each ship, there has been an improvement in the manufacture of propellants in the British service to such an extent that the life of the bores of the guns has been prolonged three, and in some cases, nearly fourfold. Foreign nations consider that they are ahead of us in the manufacture of propellants. A certain Power has recently claimed that her guns have a much longer life than those in the British service. A fleet, provided it attacks in sufficient strength, is not taking nearly the same risks in bombarding a dockyard if it is equipped with guns of "long life" as it would if equipped with guns of "short life."

C.

The increase in the size of battleships affects the coast defence artilleryman in several ways. The advantage that he gains is a bigger target, which not only increases his chances of getting hits, but also enables him to range more than one battery on the same ship at the same time and makes it easier for him to distinguish the fall of the projectiles of one battery from another. All other advantages appear to be with the fleet.

Increase in size means a more powerful armament which has been dealt with above. It also means increased protection to this armament and the vitals of the ship. The battleship of to-day is so well protected that the sinking of such a ship by the long range fire of a British fortress, armed as it is at present, is quite out of the question. The shore battery might fire hundreds of rounds at a battleship at a range of 12,000 or 13,000 yards without letting a drop of water into her or dismounting a single one of her protected guns.

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We may possibly set fire to woodwork on the ship and so cause damage, or we may damage the control stations and communications or steering gear; in fact we may impair her efficiency for fighting another ship, but we cannot hope, except by a stroke of extraordinary good luck, to cause a ship sufficient damage to make her desist from bombarding a dockyard which it is our business to defend. Our fire tactics should, therefore, aim at preventing the ship doing damage to the dockyard rather than at sinking her. The fascinating tactics of enticing your enemy to come on and then rising up and smiting him will not do for the coast defence gunner. His duty is the prevention of damage to the dockyard. The batteries he mans are designed to afford the dockyard this protection, rather than to sink the attacking ships. His endeavour, therefore, should be, if possible, to drive off the enemy before he arrives within range of the dockyard, or, if he is unable to do this, to so cover the enemy's ships with smoke and spray when they are firing, that the guns' crews cannot see to fight their guns effectively. High explosive projectiles which burst slightly short of a ship will make a smoke and throw up a spray which, if the fire is intelligently directed with regard to the course of the ship and the direction of the wind, will seriously interfere with the fighting of her guns, whereas projectiles which burst beyond the ship will probably cause no interference at all with her gun fire.

Increase in size means increase in speed. This great speed enables a fleet to traverse the distance between its base and the dockyard which it intends to bombard, or has bombarded, in a shorter time than formerly. This is a matter which affects the probability of bombardment, for it must be remembered that the fighting efficiency of a fleet depends to a large extent upon the condition of the ship's guns as regards the number of rounds they have fired, their ammunition and coal supply, the efficiency of their control communications and the state of their bottoms. After bombarding a dockyard, a fleet would in all probability return as rapidly as possible to its base with a view to refitting before it has to encounter any of the opposing warships.

D AND E.

The adoption of guns and mountings which admit of fire being carried on at ranges of 18,000 yards and upwards is a matter of great importance to coast defence. Concurrently with the great increase in the range at which guns can shoot, we have the introduction of wireless telegraphy which enables the result of fire to be communicated over long distances. Fire to be effective must be observed and corrected. The idea of sending in a "spotting" ship to observe for a fleet bombarding at long range is no longer tenable, for we all realise that a ship which comes within range of the medium armament of the fortress is liable to have some forty or fifty shell per minute bursting round her, which will make both "spotting" and the communication of results an impossibility. "Spotting" from high up in the air will doubtless be achieved in course of time, but at present a fleet bombarding at long range would have to depend upon an observing station on shore from which the dockyard is visible, and

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from which communication, either visual or by wireless, can be carried on with the attacking fleet. In the absence of an observing party on shore, long range bombardment does not offer much prospect of success, but at some fortresses the establishment of such a station without detection for a few hours does not appear to be by any means an impossibility. After the bombardment has been brought to a successful issue, the fate of the observers is a matter of comparatively little consequence.

Since an observing station has become a necessity for bombardment, it is not a much more difficult undertaking for a fleet to bombard by indirect than by direct fire. Such being the case, unless we can be quite certain at all times of preventing the enemy's observing party placing themselves at any point from which they can overlook the dockyard (the party may be unarmed and disguised in any dress), we may expect bombardment to come from any portion of the water area *within range* of the dockyard. The definition of the term "within range" depends upon the manner in which the guns of the attacking fleet are mounted; the ships of some Naval Powers are capable of firing at a much longer range than those of others. Fire at the extreme limit of range of the guns will be as effective against a large target like a dockyard as that at a shorter range. The greater the distance the attacking ships are from the shore batteries, the less liable are they to suffer serious damage from the fire of these batteries on account of the small striking velocity of the projectiles. The attacking fleet will then probably be from 13,000 to 20,000 yards from the dockyard in that portion of the water area over which the smallest amount of gun fire can be brought to bear by the shore batteries.

The increase in range of a ship's guns gives her greater latitude as to the position from which she can bombard; this may make it necessary to re-site such shore batteries as have been designed for fighting in one direction only. The battery which contains more than one gun will very possibly find its fire effect reduced to that of a single gun battery, by reason of the attacking ships being so much on the flank of the battery that only the flank gun can fire without "blasting" other guns in the battery.

Before coast defence batteries can cope with the improvements which have taken place in the defensive and offensive powers of modern battleships, the siting of fire commander's stations, batteries, battery commander's posts and position finders, must be carefully considered. These are at present sited with a view to engaging ships at a range of about 6000 yards, the idea at the time that they were designed being that battleships would run in to close range with a view to silencing the batteries, and that the batteries would endeavour to sink the attacking ships.

The more intimate relations which now exist between the army and navy have given rise to fresh and it is to be hoped sounder ideas. The dockyard and its contents is now held to be the objective of the attacking ships; these ships, instead of running in to close range, will fire at the extreme range of their guns.

To cope with the guns of the attacking ships our guns must be

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of such a nature and so sited that they can fire upon the enemy's ships when bombarding the dockyard from any position from which the bombardment is possible. If our guns can be pushed well out in front of the dockyard, it is not necessary that they should be capable of firing at as great range as the guns of the attacking ships; but when, as is sometimes the case, they are close to or even in rear of the dockyard they are designed to protect, they should have as great or even greater range than the guns of the enemy's ships. Equality or superiority in range is a necessity, but equality in striking velocity is not so necessary, for even if we had equality in striking velocity, the ship's armour would still outmatch our guns at extreme ranges. Increase in striking velocity entails a shorter life for the guns and more expensive ammunition. A fleet can effectively bombard a dockyard at a greater range than that at which it would engage another fleet.

A medium gun, provided of course that it can reach its objective, may on account of its quicker rate of fire cause as much or even more interference with an attacking ship's gun fire than a heavy gun.

The exception to this principle is the case of advanced batteries close to which the attacking fleet must pass before they gain the position from which they will bombard. In such cases striking velocity is of the greatest importance, the rôle of these batteries is to sink or badly disable ships; interference with the ship's gun fire is of little or no use; the guns should be the heaviest we can mount and the projectiles the best armour piercers we can produce. Hits are essential, "short" rounds are wasted just as much as "overs."

Every heavy and medium gun should, therefore, be mounted singly in a battery by itself in such a position that it has an all round traverse (but not necessarily an all round view over the sights), and it should as a rule be provided with the necessary number of range-finding adjuncts and communications to enable it to fight in every direction both seawards and landwards. A gun may thus have three or four position finders, in cases in which a lesser number cannot be so sited as to cover the whole water area from which a ship could bombard, and telephone communications running to each. It may also have telephone lines running to several observing stations, perhaps two or three miles inland from which fire can be directed landwards. The battery commander should be provided with a horse, bicycle, or other suitable means of rapidly moving to the most advantageous point for fighting his battery. The depression range finder in close proximity to the gun for use when the gun can be layed over the sights should be capable of taking ranges up to the maximum ranges at which the gun can fire. When we have our heavy and medium guns of the fixed armament thus equipped, it will be possible for the nation to obtain full value for the money which has been expended in providing the guns and batteries.

F.

The increase in the size of torpedo craft has enabled them to keep the sea for a longer period and so carry out an attack at a greater distance from their base than formerly.

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The increase in size combined with the great speed of such craft facilitates their jumping or breaking through the boom defences of a harbour, so that it is of the utmost importance that the anti-torpedo-boat defences should be capable of stopping boats before they reach the harbour's entrance.

G.

The increase in the range of torpedoes enables the attacking boats to discharge their torpedoes at a distance of some 4000 to 5000 yards from their objective, so that, if they could see at such a distance, the boats would never come within the range of the electric defence lights. This increase in range, however, does not effect coast defence much in the case of a night attack, because the boats must still come close enough to see their objective before they discharge their torpedoes, and, therefore, they will usually have to come well within the illuminated area or zone of the searchlights.

With these long range torpedoes, however, under certain conditions an attack by day instead of by night might possibly offer some prospect of success. If the anti-torpedo-boat defences consist of low sited guns, the limit at which these guns can be fought with effect by means of auto-sights will not exceed 2500 yards; under such conditions a boat travelling at 30 knots is less likely to be hit at a range of 5000 yards by day than she is at a range of 1500 yards by night. But here again nature comes to the assistance of the defence. In the vicinity of the entrances to harbours which are protected by moles and breakwaters, the tides and currents are almost always strong and variable, so much so that a torpedo fired at long range at the harbour's entrance has little or no chance of hitting its mark. An attack by torpedo craft by day then is possible under certain conditions, but highly improbable in the case of most British harbours.

H.

The employment of submarines has hardly emerged from its experimental stage so that it is somewhat premature to discuss their effect upon coast defence. Their presence in the vicinity of a harbour would undoubtedly place a greater strain upon the personnel of the anti-torpedo-boat defences, for it will be necessary for the gun detachments to be constantly on the alert by day as well as by night. It will perhaps be found necessary to double the manning details allotted to these guns.

It has been suggested that the submarines of the defence will be capable of keeping off battleships from bombarding a dockyard from the portions of the water area upon which the shore batteries cannot bring any fire to bear. *If* such be the case, the defence of the whole water area by day should be entrusted to submarines, the offensive defensive is always the more effective method of dealing with an attack; and the heavy guns of the fortress may confine themselves to dealing with an attack from the land side and supporting the medium guns at night. But it is early days yet to admit that submarines have such a large sphere of usefulness in the defence

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of a dockyard as to enable us to dispense with heavy gun fire seawards.

Possibly the submarines of the defence will find an opportunity of attacking hostile ships when the latter are under fire of the guns of the fortress.

I.

Improvements in naval gunnery will no doubt have the effect of making the fire of attacking ships very much more accurate and, therefore, more effective in a given time against the objective upon which it is directed. At the same time it has taught the personnel of the ships that uncontrolled fire is not of much value and, therefore, so long as the control stations remain intact, it is improbable that a ship will engage a greater number of objectives than she has control stations.

The defence then, if some of the attacking ships fire on the shore batteries with a view to assisting others in bombarding the dockyard, will greatly benefit by the dispersion of their guns in single gun batteries. A ship with two control stations could engage two 3-gun batteries at the same time, whereas to engage six single gun batteries three ships are required. To be able to fire upon your enemy without being fired on yourself is a very great advantage. If the shore batteries can divert the fire of attacking ships from the dockyard on to themselves they are for the time being fulfilling the purpose for which they were designed.

In conclusion, it appears that it is upon the heavy armament of a fortress, and the method of fighting this armament, that naval developments have had such a great effect. To cope with these developments, the nature of the heavy armament and the manner in which it is mounted, the siting of the armament, and the provision and siting of range finding adjuncts requires careful reconsideration to meet the new conditions.

The two questions to be decided are:—

A. What number of guns firing as rapidly as possible are required to render the fire of a modern battleship ineffective?

B. What number of hostile battleships in a fleet which is bombarding the dockyard can fire on the dockyard at any given moment?

The answer to A multiplied by the answer to B determines the volume of gun fire which a coast defence fortress should be capable of bringing to bear upon bombarding ships. The answer to B will usually be greater when the ships are using direct fire than when they are compelled to use indirect fire.

Looked at from a national point of view, the situation is none too bright; but from the point of view of the Garrison Artilleryman, the chances of his having to fight his guns are far less remote than they used to be. Not only have recent naval developments tended to make an attack on a dockyard a more probable contingency than

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heretofore, but the command of the sea is becoming less and less a British monopoly. Should we be engaged in a European war in the near future, there is a reasonable prospect of one or more of our coast defence fortresses being called upon to keep off the enemy's ships for a time. Here the Garrison Artilleryman will take his part in the first stage of the war. Later, after the navy have obtained command of the sea, he will lay aside his defensive rôle, and equipped with movable heavy guns and howitzers, carry the war into the enemy's country and once again live up to his motto, *Ubique quo fas et gloria ducunt.*

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Notes on the War in the Peninsula, 1808-10.

Including the "Giron" diaries. Edited by Major J. Arzadun, Spanish Artillery.

By MAJOR GENERAL J. C. DALTON, R.A. (retd.).

(With Map).

(Continued from page 276).

State of the Corps.—A shower of punishments.—Impostors and shirkers.—Extremes of caution.—Value placed by the Junta on a French General.—Irresistible pressure.

There is more to be gleaned from a book of orders than might appear to a casual observer. The subject which we now extract from it is that of "instruction"; and the attention paid to this is quite natural when we remember that the army was made up of recruits.

The instruction seems to have been painful and incomplete, a plain proof that if the soldiers were raw, the officers were far removed from being masters of the art of war. In addition to six hours daily of schooling, there were also two told off for theoretical instruction given by the Commanding Officer in his own quarters to his officers. This not infrequently served the double purpose of instruction to the teacher as well as to the pupil!

Few days passed without signs of impatience on the part of the fiery Alburquerque, who gave orders that "besides manual and firing exercises and evolutions by each corps separately, the units composing his command were to manœuvre jointly, because although they might not be accustomed to this, it was indispensable that they should no longer neglect this important exercise."

Of the state and composition of the various corps, General Giron's interesting memorandum to his Commander-in-Chief gives a clear idea:—

"The regiment of Africa barely numbers 200 old soldiers, the others are recruits without any training—that of Murcia is in the same state—that of Loja, formed with a nucleus of some of the battalion 'de la Reina,' and with a few Swiss from the regiments which were in our service, has had some instruction but needs musketry practice and has not yet seen the enemy. The Alcalá regiment formed from a battalion of Volunteers raised in Granada at the commencement of the war and with the addition of some Swiss, is well instructed and served at Bailen, but has since been made up with a lot of new men. The Ecija regiment never saw the enemy till the action at Somosierra where it arrived at the moment of defeat. The Ecija battalion has not yet seen the enemy."

When such heterogeneous elements have to be dealt with it is

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hardly to be wondered at that with the orders for instruction there should alternate numerous directions for punishments. In one day's orders, besides detailing fifty men per regiment "to assist at the punishment by flogging of three soldiers from Siguenza," without stating for what crime, we read as follows:—

"To-morrow at 10 o'clock Blas Piedras will be punished by running the "gauntlet four times through 200 men for the crime of being suspected, and "will then pass on to complete six years in prison. In a similar manner and "at the same hour Philip Cerezo will be punished for the crime of desertion; "and, because he pleaded in justification that the penal laws had not been read "to him, an extra six years imprisonment has been imposed."

There are quantities of orders repressing abuses in all the hierarchies; one prohibits generals from having more aides-de-camp than is prescribed in regulations; another reminds infantry officers, from captains downwards, that they cannot have horses, when there is such a scarcity of horses for mounting the cavalry; another corrects the prodigality in granting commissions and leave. The arrest of a group of sergeants, and even officers, is announced for neglect of duty on the day when a court martial was sitting "on Don Juan Perello accused of having personated a sub-lieutenant of Cazadores of Malaga." Another order imposes fifty lashes on a soldier of Calatrava for falsifying a passport, and fifty on another soldier from Loja for selling his ammunition.

"The Standard bearer (Cornet) of the Bourbon cavalry, D. Francisco Maldonado, "made a reconnaissance with only eight men on the 18th ultimo, on the occasion "of the attack on the enemy at the action of Consuegra, and acquitted himself "so gallantly that he accounted for 17 of the enemy in killed, wounded and "prisoners, and captured 9 mules. He was suspended from duty for the crime "of discretion (sic)[1] and was only re-employed owing to his importunity."

The General in Chief declared that the Cornet's brilliant action had condoned his offence and ordered that he was to resume his work without any record against him.

One notes in every page evidence of administrative disorder. Commanding officers have to be reminded that soldiers admitted to hospital are not to take with them "arms, helmets, and accoutrements," and it is remarked that the proportion of sick was so large that it became necessary to detail parties to receive those whose health became re-established. One order says:—

"Experience invariably proves that in circumstances like the present there "are bound to be many individuals, vulgarly known as imposters and shirkers, "who spend their time going from one hospital to another; these cowards, "skulkers and brawlers are the dross of armies and should be persecuted with "the utmost rigour . . . ."

The courts martial were severe; it was found necessary to mount a special picquet daily for administering corporal punishment.

A Sergeant-Major of the Texar Cavalry Regiment was degraded,

"for having separated himself from his standard during the retreat from "Cascante; he is to serve in the ranks of the regiment which elects to serve "throughout the war, special instructions being given to the commanding officer "to see that he performs the duty pertaining to his class. The civilian, Don "Juan Chaes, condemned to the gallows for treason, will be shot for lack of a "hangman."

The task of reorganization was vast and continuous. Fortunately money was not wanting;—

[1] Query? Initiative?—*J.C.D.*

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"Bills are paid regularly and the finance minister of the division attends "punctually to the many expenses; commanding officers are authorized to pro "cure direct articles of headgear, and short gaiters of flax which are always in "demand."

Large subscriptions came from America.[1]

In those days the Central Junta besides encouraging the generals to pay spies liberally, communicated secretly with commanding officers (records of which custom are to be found in the national historical archives) in a manner which reveals the profound contempt which the avaricious rapacity of the enemy had excited in the popular mind. They were invited to induce the French Generals to betray their Emperor and their cause. That this was the case, and that the idea was not considered infamous is clearly proved because after the defeats of Ciudad Real and Medellin, where the inferiority of the Spanish troops was plainly shewn, the secret instructions (*reservadismos*) plainly inform us that the price offered for this ignoble contract was one million dollars (£200,000) in cash, or land in Spain or America,[1] which was to be given to the traitor general who should give Spain the chance of another Bailen.

The high-minded General Cuesta expresses his opinion freely about such dealings, which he would never tolerate. Not thus with General Vives, who was weak enough to approach the Italian General, Lecci, with an offensive proposal of a like nature, which was indignantly repelled.

With April, 1809, the battle fever grew in intensity. Alburquerque had already left with his small command to reinforce the army of Extremadura. The desire for putting an end to the prevailing inaction was general; the troops were heartily sick of perpetual instruction in cantonments; officers yawned and soldiers grumbled.

The Central Junta depicts in glowing terms and with contagious enthusiasm to the General in Chief the importance of a success at this time. "The north, already uneasy and agitated, will revolt against the enemy."

So General Cartaojal, dominated by the irresistible current and pressure of public opinion which he interpreted on all sides, yielded at last, notwithstanding that his own opinion was opposed to offering battle under conditions which he quite saw were so unfavourable; and closing his eyes to the noon-day light, hoped earnestly and with perfect faith for the best. When starting on his absurd venture[2] he writes thus to King Fernando:—

"Fully convinced of my insufficiency I must beg of your Majesty to encourage "in all a pious fervour, in order that we may implore and call upon the God "of battles to aid and protect us, and so may triumph over our perfidious "enemies."

One cannot too strongly condemn those mistaken generals whose one idea seemed to be that salvation was to be found in pitched battles; and it was the worst form of cruelty which put such pressure

[1] Presumably South America.—*J.C.D.*

[2] Viz.: To drive in Victor's cavalry and re-capture La Mancha, imagining that there was only cavalry to bar his way. But Alburquerque who was sent on in advance with 9000 infantry and 2000 horse, after a skirmish with the enemy's cavalry, encountered Sebastiani's division and other troops, and had to retreat (Feb. 18). Later, on March 27, Cartaojal resolved to make a dash for Toledo, but the result was the disaster of Ciudad Real.—Oman, Vol. II., p. 146.—*J.C.D.*

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on a cautious leader as to practically force him against his better judgment to undertake an impossibility.

During those fateful days the conscientious Giron was daily occupied, according to orders, in examining the officers of his regiments, and was just about to take in hand the Loja regiment, when he had suddenly to countermand his inspection.

It was the 27th March, 1809, the date of the battle of Ciudad Real. The rout was terrible; it was destruction without a battle; a hard and bloody lesson which did not even then succeed in convincing those who were really responsible for such mad enterprises.

PART III.

Six campaigns at one time.—Sir Arthur Wellesley.—Unjust judgment.—Sympathetic attitude of Spaniards towards English.—Attention paid by the English to Castaños.—The first impression.

During the month of May, 1809, the ardent and unceasing struggle in the Peninsula got split up into half a dozen independent campaigns. Victor, engaged with Cuesta in Extremadura, was astonished to find another army created, more numerous than that destroyed at Medellin; Sebastiani was not able to prevent Venegas from reorganizing fresh battalions in the Sierra Morena out of the wreck from Ciudad Real; Ney was invading the principality,[1] whilst Suchet defeated by Blake at Alcañiz was preparing an ample revenge at Marias and Benchite; and St. Cyr was devoting himself to subjugate the indomitable provincial volunteers *(somátenes)* before capturing Gerona. And, the renowned Wellesley who had already inaugurated his series of notable successes, plunging into a hazardous campaign against Soult in Portugal was anxiously labouring to co-ordinate extremes by inviting the veteran General Cuesta, under whose command the Junta had just placed General Venegas, to act with him. Thus the armies of La Mancha and Extremadura proceeded to attempt, in conjunction with the English, the fascinating, but impossible, undertaking of freeing Madrid.

The famous British leader presented a majestic figure. Forty years of age, a nature of iron, and endowed with prodigious activity, which remained unimpaired after seven years of Indian service, frugal in his habits, and never overcome by sleep or fatigue; so indifferent to the glamour of military uniform that he, more frequently than not, rode through the camps in civilian dress with grey trousers and a round hat, or when in uniform, with a simple blue frock coat and cocked hat without a plume, and attended by the most limited escort.

The confidence of his soldiers in him was great, and one of his veterans has written " the sight of his long nose on the morn of a battle is worth ten thousand men." His great penetration led him to discover an impregnable position (the lines of Torres Vedras) in the same Portugal which had been declared by Moore a few months earlier to be incapable of defence; further, his experience as a soldier

[1] The Asturias.—*J.C.D.*

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revealed to him the irremediable defect in the hitherto victorious tactics which had dominated Europe; he first of all proclaimed, and then practically demonstrated, the superiority of the line over the column, and in such a manner as to entitle him to be called the first infantry leader in the world. Though his soldiers admired him they did not love him, and seemed to read in his imperious glance the aristocratic disdain and depreciation of them which he expressed more than once in his writings, and in his evidence before a Royal Commission.

Major Arzadun[1] explains that in drawing attention to these peculiar traits in the character of this great general it is certainly not with the object of in any way drawing attention to defects, still less to throw unmerited discredit on the allies of the Spanish nation, but solely to reduce to its proper value Wellington's depreciation of the Spanish troops, an opinion which history freely reproduces.

The sincere admiration and genuine sympathy of the Spanish towards the brave British troops, is constantly borne evidence to in the writings of Giron; take for example the following description by him of the assault on Badajoz, when writing to his Chief of the Staff, Roselle:—

"The taking of Badajoz is most glorious from the special circumstances under "which it was carried out. I do not think that anyone doubts that the Lord[2] "is one of the greatest generals who has ever lived, and that his troops are the "best ever known."

Sir Arthur Wellesley's relations with the Spanish generals appear according to the memoirs we are now considering, to have been highly courteous and cordial.

Giron, writing from Fuentes de Oñoro towards the last few days of the year 1811 says:—

"On the 8th at noon we arrived at this town where the General in Chief "(Castaños) had arranged to take up his quarters for the time: Lord Wellington "called on him very soon after his arrival. It would not be possible for anyone "to have received greater proof of consideration and regard than our general "met with at the hands of the English and Portuguese during this journey. It "would be well for the public to be aware of this fact, in order that they may "realise that we are well esteemed by the English, and not the reverse as is "sometimes believed."

Castaños, writing to Giron from Aldea del Obispo, in the year 1813 says:—

"I had a visit from 'the Lord.' It is the second time since your departure; "and it was for the kind purpose of telling me it was to compensate for your "absence, and to urge me to spend a day in Fresnada where he thought I should "be better amused than here."

Some days later he writes:—

"If I was not vanquished at Albuera, I was completely so on the celebration of "the anniversary of that battle. We did not rise from table till 11.30 p.m.; I "was saluted, all upstanding and 'no heeltaps,' whilst the cheers given to "Beresford and even to Blake were taken sitting and in the manner of an "ordinary mess function. We were 44 diners. Alava desired me to let you "know that your confidential letters to 'the Lord' should be always in Castilian "which pleases him better than French."

It is interesting to note the impression produced on their English allies the first time that the Spanish and British armies united. It was on the 10th July, 1809, at the commencement of the operations

[1] Editor of the Giron letters.—His description of Wellington which is here considerably condensed is mainly from Oman's "History of the Peninsular War." *J.C.D.*

[2] So styled in familiar correspondence at that time.—*J.C.D.*

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which culminated in the victory of Talavera, as glorious and sanguinary as it was sterile.

Wellesley with his staff advanced to elaborate his plans with General Cuesta, who received him at the foot of the pass of Mirabete, where were drawn up the 36,000 recruits whom the national energy had caused, as it were, to sprout up out of the "ensanguined" soil.

The ignorance of his guides misled and retarded the British general. Dusk had already set in, and the Spanish troops had spent four hours in readiness under arms. At their head was the veteran General in Chief on horseback; his wounds received at Medellin were as yet unhealed.

The future Lord Londonderry, who accompanied Wellesley, writes:—

"Our arrival in camp was heralded by a discharge of artillery, and all at "once an immense number of torches illuminated the Spanish lines. The scene "was extraordinary. The torches held up high at regular intervals shed on the "ranks a ruddy and oscillating light throwing into relief the fierce and swarthy "faces of the soldiers whose bright weapons and dark uniforms formed as it "were, separate blocks cut out of the undulating plain . . . ."

"The venerable Cuesta preceded us, supported on his horse by two aides-de-"camp who were in danger of falling to the ground with him everytime that the "report of a gun or the glare of a torch frightened the animal . . . ."

"Then we reviewed some 6000 cavalry and more than 20 battalions of from "700 to 800 bayonets—all without exception were remarkably fine men. Some "were undoubtedly very young. too young for war particularly amongst the "recruits last incorporated; but as a body it would have been hard to have "found soldiers in Europe more robust or of hardier appearance. We cannot "apply the same encomiums to their armament: there are battalions properly "equipped and clothed, but, as a rule, they are deficient of many things, above "all of shoes. It is easy to gather from their movements and from the manner "in which they carry their arms, that they have little or no discipline: they "cannot be considered other than irregular troops. They are in fact peasants, "partly provided with the equipment of a soldier, but without the aptitude or "training of the latter. The generals appear to be selected for no other reason "than for seniority."

"With the exception of Zayas and O'Donoju, they are nearly all old, and "incapable of enduring the fatigue of war.

"Not so the colonels and commanders of battalions who seem young and "active, some having the makings of really good officers."

The judgment of the writer of the above is correct and the description is faithful. The Spanish recruits were far removed from being an army. Their steadiness, wonderful in the defence of fragile walls, their personal valour verging on rashness, as manifested in the daily encounters of guerilla warfare, did not suffice to impart to badly trained battalions, the saving consistency, the shoulder to shoulder feeling which leads the veteran to sacrifice himself in guarding lines and positions which means nothing to the untrained man. Panic having broken the ranks during a battle, General Cuesta, indignant, shot some fifty fugitives because he would not admit as an undeniable principle the congenital debility of improvised armies.

Marshal Victor, writing to Marshal Jourdan, says:—

"The entire population of the district has retired behind the shelter of "Cuesta's lines, after destroying their animals and crops, thus depriving us of "all means of subsistence. The enemy evidently aims at destroying us by "hunger, and at leaving us a desert to advance over."

We see here that there was a system for implacable destruction of their own resources by the Spaniards, similar to that which, later, moved the Russians to burn Moscow. It alone sufficed to determine

[1] This is a fairly literal translation of Major Arzadun's article, Oman quotes the same letter in his "Peninsular war," Vol. II., pp. 470-2.—*J.C.D.*

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the retirement, without fighting, of the first French Corps which evacuated Extremadura and recrossed the Tagus.

On the other hand, the country people by intercepting mails; and guerrillas by destroying convoys, served to isolate the French and keep them in complete ignorance of the plans and movements of an enemy which was enabled to study from the contents of intercepted mail bags the latest details of the enemy's plans.

Wellesley was already in Plasencia, thirty leagues distant from Madrid, when Joseph[1] wrote to Napoleon that he knew nothing of the enemy's whereabouts. "There is no more obvious proof," says a British historian, "of the great services which insurgents and "guerrillas lend to the Allies."

PART IV.

Audacious advance of Venegas.—Prudence of Giron.—Skirmishes.—Spirit of the country.—Retirement of the Spanish forces.—Castaños congratulates Giron.—"General Retiradas."

Towards the middle of June, 1809, the news of the retirement of Marshal Victor to Talavera decided General Venegas to undertake a hazardous excursion through La Mancha. Giron in the daily report which he made to his Chief as to the position of the enemy, plainly shows that this advance, which no one seems to have approved, caused him anxiety.

Writing from Almagro on 17th June, 1809, he says:—

"The French Cavalry 1950 strong are in Malagon. Should the enemy desire "to support the cavalry with infantry, we shall to-morrow be in a similar posi- "tion and condition at Ciudad Real, as that which led to the disaster of March "27; close to the Guadiana and probably with a smaller force, especially in "cavalry."

"Although I understand that the particular operations of a division are part "of a general plan for the whole force, which the Divisional Chief need neither "know nor enquire into, it appears to me all the same, to be my duty to make "this observation to your Lordship on account of my great desire for the glory "of our arms. In any case I flatter myself that the troops which I have the "honour to command will render a good account of themselves."

There could be nothing more audacious, however one may regard it, than that movement which exposed Venegas to being destroyed on the first occasion when his battalions, which were unaccustomed to war and not recovered from their recent defeat, should encounter the Corps of Marshal Sebastiani, but little inferior in numbers. Giron's observations had the effect of modifying, if not of postponing, his march, and he received orders to remain in Almagro. Light skirmishes served to animate the Spanish troops.

"The guerrilla parties of the cavalry regiment of Montesa at Carrion, when "reconnoitring the bridges of the Guadiana, observed on the other side of the "bridge at Malvecino, a body of the enemy, who trusting to the barricade at "the bridge which they had made out of millstones, wood and obstacles of all "kinds, remained firm. It was resolved to attack them which was done with "the greatest gallantry, and in disregard of every obstacle. The enemy, sur- "prised, were forced to fly, but our party charging them, killed a sergeant and "took two prisoners with their horses all belonging to the 1st Polish regiment. "The soldiers treated the prisoners with every kindness, but a civilian of this "town when conducting the party to me stabbed one of the prisoners whose "injuries I had attended to in my own house. Both prisoners wished to serve "on our side; one was a German and the other a Pole."

[1] Joseph Bonaparte, King of Spain and brother of the Emperor.

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The French, although numerous enough to destroy the 18,000 infantry and 3000 cavalry of Venegas, retreated under the belief that they were attacked by 40,000 men. The people acclaimed their deliverers with great rejoicing.

Giron writes:—

"Daimiel received us with great joy and the Alcalde and magistrates are "to-morrow giving the troops a ration of meat gratis. It is not possible to see "without emotion the demonstrations which our people make towards their "soldiers. There is not a person in the town who has not brought food of some "kind or other to the troops, nor is there a woman who has not freely under-"taken to wash the clothes of their liberators or to lend them anything they "wanted. This spectable should of itself suffice to make every soldier ready "to sacrifice himself for the nation (Villarubia, 21 June)."

On June 22nd Venegas sent to Giron copies of the *Gaceta* of the 19th inst., which announced that Napoleon had been defeated in Austria with a loss of 50,000 men and 200 guns, in order that it should be published to the army and neighbouring towns, and that means should be taken to let the news reach the French troops.

The advance proceeded without obstacle; a few small bodies of the enemy were encountered who fell back without resistance. The alarm produced amongst them was great. According to secret infor-" mation "they have sounded the general alarm in Consuegra on the " last two or three days. Yesterday on three occasions they turned " out armed, and occupied their posts."

But the popular enthusiasm, when more closely looked into, did not turn out to be as great as at first sight was imagined.

Giron writes from Almagro on June 17th:—

"I told your Lordship yesterday evening that we had been enthusiastically "received in El Moral, but later, I saw the French were not regarded with such "very great horror, because owing to their being well served by a local Junta, "they themselves had appointed, no hurt was done to the town. Many people, "however, came out here to-day, and received us with great demonstrations, "but it was only the better classes who displayed effusions of patriotism: the "enemy had got on very good terms with the populace . . . ."

"I should mention to your Lordship that neither in El Moral nor here have "I heard a single person acclaiming the Sovereign."

To this Venegas replied with admirable common sense:—

"I am not surprised that the people should look on the French with less "horror than their iniquitous conduct deserves, nor that they should have got "on well with the lower orders in Almagro. Fear accounts for the former of "the above statements and, as regards the second, unfavourable opinions freely "expressed regarding our leaders, which are always readily listened to by the "lower classes, account for the popularity of the French with the latter. But "as a general rule the French are hated, and in proportion as we are successful; "against them, so shall we receive approbation."

Here we see laid bare the noxious sore which was corroding the unhappy invaded people. To counteract the hostile reserve of the worthy, the French entrusted the most tyrannical authority to any unscrupulous person who sought it, and this *canaille*, who in normal times would be relegated beyond the pale by their idleness and vice, assumed the reins and repaid with shameless haughtiness the well deserved contempt they had before experienced.

Before long, the news which filtered in clearly shewed in the increasing uneasiness of Giron who, writing on 19th June, says:—

"A person belonging to this town reports 7000 men as leaving Madrid to rein-"force the enemy whose retrogression is said to have for its object the drawing "of us out of our positions in the Sierra, in order to attack us on ground less "favourable to us."

At last Venegas received confidential intelligence which decided

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him to retreat and thus to save the situation, and writing on 24th June from Villa Rubia, he says:—

"At this very moment (10.15 p.m.), there has arrived a civilian, sent by the "Alcalde, a writer and prior of the friars of Madridejos, with a document "signed by the Alcalde as a passport, and he informs us on the part of the "friars that the cavalry of the division of Velay, who do not exceed 800 sabres, "are to leave to-night in the direction of Villata, and that the infantry will "follow the cavalry at 3 a.m., with the intention of attacking us: that orders "have been issued for to-morrow to sweep the streets, in readiness to receive "the usurping King who with 10,000 men is to arrive in the course of the day. "General Sebastiani is in that town."

And here it happened by one of those confused reasonings, which are so much to be dreaded in war, that Giron came to the conclusion that the above lavish budget of news which reached him with such prolix details, had for its sole object

"to enlighten us concerning the dangerous retirement which is to be under- "taken to-night, for which reason I consider it would be better to march against "the enemy and charge whilst they are on the move.

Fortunately fresh news, received at 7 a.m. on the 25th, announced the presence of considerable forces detached from Victor's army, in view of which Venegas wrote to Giron officially from Avenas at 1 p.m., commencing as follows:—

"I have determined to make a retrograde movement in order to force the "enemy to follow up . . . ."

One of those extraordinary chances, which can only happen with improvised troops, very nearly prevented Giron from starting off on this most opportune retreat; a sergeant of the Burgos regiment dared to use the name of the General Commanding in Chief to give the false and fatal order to continue the march. The error was discovered in time, and not a moment was lost, as will be seen from the following entry in Giron's diary:—

"I despatched Colonel Maupoey (captain of Engineers) with his own company, "another of chasseurs and 50 cavalry to cut the bridges, and we marched for "Carrion at 5 p.m., on the 25th with the utmost order and quiet."

Giron arrived at Almagro at 1 p.m. on the 26th, having been obliged to halt to give his troops food and rest, and was forced, owing to the necessity for rapidity, to march during the hottest hours of the day. He writes:—

"Fearful heat; I have had some men suffocated by heat and three lost in "a well. The division was somewhat disorganised owing to the power of the sun "which interfered with its progress. One of my detachments happening by mis- "take amongst the commissariat and transport parties of the third division "fell foul of them and committed several excesses . . . ."

On the day following, the 27th, Giron's retirement was resumed at 1 a.m., and his force arrived at sunrise at El Moral where they rested till 5 p.m., arriving at Valdepeñas at 11.30 p.m.

On the 28th repeated messages from the commander of the 2nd division, who had observed the enemy in Manzanares, and demanded reinforcements, compelled Giron to adopt precautions, and it is worth while quoting his description of a night march in the vicinity of the enemy:—

"I sent him the Santiago regiment of cavalry and formed my division in "close columns wedge shaped: two columns in front, and the artillery in the "centre. There we passed the night. At 2 o'clock in the morning I received "orders to march on Visillo. I ordered a wheel half-left and marched in close "column the artillery in front, then came the infantry and, half a league "further back, the cavalry with two guns. At midday we arrived at Visillo "whence I was despatched to Puerto del Muradel."

There "King Pepe" (as they called Giron), and his 27,000 men arrived safely, having been miraculously saved from an attack.

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General Venegas had accomplished by good luck and with skill the most difficult of military operations, viz., a retirement without loss over an open country and in presence of a numerous and enterprising enemy well supplied with excellent cavalry. Giron writes:—

"I received a letter of congratulation from Castaños, with a spice of his "festive wit which made all our friends laugh. He praised us and highly "approved of our retirement."

Between the lines of friendly congratulations, however, Venegas perceived signs of badly disguised commiseration which incensed him. His reputation which was at its zenith when he began his rash and objectless advance fell to its nadir when, recovering his sounder judgment, in face of imminent danger he corrected his first error with well timed magnanimity.

The influence of optimistic madness obscured for ever the serene reason of the general, and served to lure him on towards the approaching catastrophe.

Never again to retire without a battle! When, later on, there arose the evident necessity for falling back before the irresistible onset of very superior forces, the luckless commander was to blindly allow himself to be rent asunder with a desperate and stoical resolve, sacrificing everything, his reputation, soldiers, his very country even, rather than run the risk of being a butt for the jests of the "man in the street." And by an inexplicable contrariness, his sorely tried mind was to lead him to prefer being remembered as the vanquished of Almonacid rather than that a corrupt rabble should in jest style him " General Retiradas."[1]

PART V.

Foresight of Wellesley.—Strategic plans.—French tactics.—Their defects.—Line *versus* column.—The British soldier.

General Sir Arthur Wellesley arrived at Lisbon on board the " Surveillante " frigate on 22nd April, 1809, having narrowly escaped shipwreck off the Isle of Wight the first night out.

One cannot but reflect on what would have been the effect on the history of the war, on the life of Napoleon, and on the world generally, had the fury of the waves been a little greater, or the skill of the captain a little less!

Wellesley had already with prophetic foresight sketched out in an admirably written memorandum, before he left England, the general lines of the task which lay before him.

He was to defend Portugal with only 30,000 British troops, reinforced by the local troops which were being organized by Beresford.

And his absolute confidence was entirely logical; in order to beat him the enemy would require 100,000 men, a force they could not unite against him without depleting, at great risk, the garrisons in the rest of the Peninsula, and, moreover, expending some 200,000 more men in the defence of posts and communications against the incessant and audacious attacks by armed parties.

For the British general, the ills which afflicted unhappy Spain were advantages; the devastating misery which had converted into

[1] "General Retreat."

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a sterile desert districts previously fertile favoured him; and the more the enemy distributed himself in invading new provinces over practically the entire country, so much the better for him.

He meanwhile, liberally supplied by the British fleet, could afford to bide his time till the favourable moment arrived, whilst the powerful French armies were gradually dissolving without fighting under the implacable rancour of the outraged nation they were invading. His presence in the Portuguese Extremadura constituted of itself an uneasy feeling of menace on the enemy's flank. His great care was to avoid any chance of being beaten or surrounded; he knew that the 30,000 men allotted to him were the most that England was disposed to risk in the contest. To preserve them was the object of his constant care; in order to collect abundant provisions for them he was engaged in perpetual struggles with the Central Junta; for their protection he prepared and strengthened the impregnable lines of Torres Vedras, against which, later on, Masséna launched his formidable attack.

Before taking up his command, Wellesley had satisfied himself, from a profound study of the subject, as to the grave defects of the French tactics, which were the same that had proved so successful since the wars of the Revolution. As a preliminary of the battle, the army threw out a dense cloud of skirmishers who prepared and masked the decisive attack of the battalions which was delivered in column. The skirmishers with their deadly fusillade forced the enemy to disclose his position and the weak places in his line, and drew on themselves the fire of their opponents so that the assaulting columns arrived unscathed at the enemy's position which had already been well searched by the fire of the skirmishers. In this way the irresistible advance of the column, with the proverbial French *élan*, conclusively decided the victory.

This invariable system, in spite of the successes which have attended it, presented to the penetrating insight of the British general a grave defect. Of the entire column only the two leading ranks were able during the advance to utilize the efficacy of their fire. Generally speaking, the front of the battalions was of the extent of one company; sometimes of two; or forty men in the first case and eighty in the second. As the six companies of the battalion were formed in three ranks, the depths of their formation was eighteen men in the first case and nine in the second, and it is evident that the ranks which followed the two first had only for their object to give confidence to those in front, and solidity to the combined body, and to infuse into the enemy the terror which is inspired when an irresistible and overpowering wave rolls in on one.

This is what Wellesley spoke of as the "old style."

But when the assault is received by troops in line, of exceptional firmness, above all when the line is two deep, as preferred by Wellesley, the difference in intensity of fire of the line and column is enormous. A battalion of 800 men in line will rain 800 bullets at each discharge against the 80 which the column can return at the same time. The truth and exactness of this simple calculation was made patent to all at Talavera, Bussaco and Albuera.

Thus it is; in order to succeed one requires either the impassive solidity of the British soldier or the hail of grape, so destructive to

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the attacking columns, to which were due the Spanish victories at Bailen and Alcañiz; otherwise the extended line without reserves would first of all be broken through and then rolled up by the cavalry as happened to General Cuesta at Medellin. For this reason the tactics which were so effective for Wellesley were fatal to the improvised Spanish hosts, whose skirmishers, less numerous and less skilled than those of the enemy, were not sufficient to prevent the columns rushing their lines with such arrogance and mettle that it was impossible to resist it. It was also fatal to the Austrians and Prussians who, employing the line of three or four ranks designed by Frederick the Great, preceded only by a scanty number of skirmishers, collapsed before the sudden and furious onslaught of the attacking columns.

Wellesley aimed at concealing his main line for as long as possible, taking advantage of folds in the ground or the shelter of a wall, or simply defiladed by the crest which covered them. In order to contain the enemy's skirmishers, each battalion deployed its light company, forming a whole supported by special bodies composed of skilled marksmen, told off to each division with this object. In this way, the enemy's skirmishers were delayed long enough to force him to send forward his columns in support.

Directly the columns appeared, the English marksmen fell back under the protection of the main line, which was still intact; all the musketry fire was concentrated on the leading ranks of the assailants, regular and accurate volleys followed each other, decimating the leading companies; finally these hesitated, fluctuated, whirled round under the castigation caused by the hail of lead, and ended up by retiring in disorder, severely handled.

The French *élan* was dashed to pieces on the British rock.

The British soldier of the Peninsula days was a professional at war; nothing discouraged him; a type of the old cavalier of fortune, he found a real joy in the excitement of war and especially when engaged on foreign soil against his traditional foe. He had no neighbouring and friendly hearth to retire to in the event of disaster, as had the Spanish recruits, his allies. For him, the unbroken ranks meant everything, his hearth, family and country. His psychology resembled that of the primitive man, laborious and sensual; irresistible in the assault, because in rushing on the breach his mind was fixed on the booty before him and on the noisy orgy of the sack which followed victory, when discipline was temporarily relaxed.

Possibly he may have earned the anathemas of moralists; but he justly deserved the enthusiastic admiration of soldiers. His superiority not only over the Spanish untrained recruits, but over the war-trained hosts of Napoleon, gives rise to the thought as to whether in the not very distant future, the theory of the armed nations of to-day who, improvising countless legions cover with the martial helm the thoughtful brows of severely civilized and intellectual beings, may not be wrecked before the victories of a reduced phalanx of adventurers, professionals in the art of war, plethoric with fierce energy, enamoured of danger and death, marching to the attack as to a supreme festival!

(To be continued).

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The Jurisprudence of the Air.

By LIEUTENANT A. G. LEECH, R.A., LL.D.
BARRISTER-AT-LAW.

THE rapid progress of the science and art of aviation during the past few years suggests many new developments. Though the conquest of the air is still in its infancy, the possibilities attaching thereto have made a profound impression on the nations of the world, and it is safe to say that the question of legislation will shortly become one of keen international interest.

It is unlikely, for the present at any rate, that this means of transit will be largely used by ordinary travellers; but for belligerent purposes it is certain to develop into a factor of considerable importance. Naval and military men of many countries have begun to recognise the fact that a properly equipped air fleet is a necessity for every modern army, and that these new instruments of warfare will play a not unimportant part in the decision of future campaigns. This introduction of a new element will make necessary the addition of a number of fresh articles to the recognised laws of war, which are undergoing a gradual process of codification.

But the airship must also be taken into account in time of peace; and such being the case, a body of rules governing the navigation of the air will in the future be as necessary for the well-being of aerial voyagers as is the code of maritime regulations for the welfare of travellers by sea. The question is one which should be of interest, not only to the student of international law, but also to the naval and military professions and to intelligent civilians. It is proposed in this paper to discuss the principles upon which such regulations should be based, and to point out the sources from which some of them may be drawn.

This article is entitled "The Jurisprudence of the Air"; the Laws of the Air has not yet been developed. The words "Law" and "Jurisprudence" have frequently been used as synonymous, but this is wholly incorrect. Jurisprudence is the science of law and deals with principles; law, on the other hand, is a collection of rules based upon such principles. The establishment of principles which would be acceptable to nations generally is the first step in this development; when these have been established the difficulties in the way of the construction of an international code will have been largely removed.

The present position being novel, not much has yet been achieved towards the settlement of the principles which should affect the points involved. A few tentative steps have been taken for the purpose of ascertaining and formulating the opinions of the leading international

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jurists of the various countries. At the Hague Peace Conference of 1899, a declaration was adopted, though not unanimously, prohibiting during the five ensuing years "the discharge of projectiles and "explosives from balloons or by other new methods of a similar "nature," and this period expired on September 4th, 1905. At the Conference of 1907, also held at the Hague, the majority of the delegates accepted a resolution to the same effect, but the time limit in this instance was fixed "for a period extending to the close of the "Third Peace Conference." The foregoing are the only instances of attempts to draw up legislative rules for the acceptance of the various Governments.

It is a mere juristic truism to say that a thing cannot be the subject of property, private or public, unless it is capable of a certain amount of control. The fundamental idea of property or ownership is the power of excluding others from enjoyment of, or interference with, the thing owned. The development of this principle has led to the established doctrine that the sea cannot be the subject of ownership by any individual or State, inasmuch as vast tracts of water cannot be occupied and controlled in such a manner as to prevent the access and passage of individuals and vessels belonging to other States. Instances of attempts to establish sovereignty over the sea are not wanting, and it is worth while to refer to a few of them, inasmuch as upon this point the analogy between the conditions of the upper air and the open sea will be found to be exceedingly close. Spain, Portugal, Holland and Great Britain, have endeavoured from time to time to establish exclusive jurisdiction over various portions of the open sea, but by the middle of the eighteenth century these claims had disappeared, and control of the sea had become practically limited to the territorial waters of the different States.

A remarkable attempt to overthrow this doctrine, which had curious ulterior effects, was made in the year 1821, when Russia published a ukase claiming jurisdiction over the Pacific north of latitude 51°. This proceeding was immediately challenged by the two Powers chiefly concerned, namely, Great Britain and the United States. The distance from coast to coast along the parallel named being about 4,000 miles, it was manifestly impossible for any nation to attempt to control so large an expanse of water. The controversy ended in the abandonment by Russia of all claim to sovereignty outside her territorial waters.

In the year 1867 Russia, in consideration of a money payment, ceded her North American possessions to the United States. For some time previously Canadian fishermen had been actively engaged in the Alaskan Seal Fisheries, a growing and profitable industry. In order to secure for themselves the profits of this industry and to exclude the Canadians, the United States, following the example of Russia, attempted to establish the doctrine which they had previously resisted with vigour and success; viz., that the territorial waters of Alaska included a tract of ocean 1,500 miles long and 700 miles broad. Great Britain objected, and the question was referred to a Tribunal of Arbitration which decided against the United States on all the counts. This decision may be taken as having closed the question whether the open sea can under any circumstances become the subject of proprietary rights.

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For reasons similar to, but stronger than these, it is impossible that the upper air can become the subject of ownership either by state or individual. The Roman lawyers, in drawing up their classification of things, placed the sea among "*res communes*" and included the air in the same category. This, at first sight, may seem to conflict with the well known maxim of the Roman law "*Cujus est solum, ejus est usque ad cœlum.*" But they did not mean by this that the owner of the soil was entitled to control the whole atmospheric space above the land. The real meaning is that the owner of the ground has a property in everything which grows or can be erected upon that land; but a claim to proprietary rights in the air within these limits cannot be regarded as unreasonable. It is quite practicable to plant trees and to erect buildings so that a real and tangible control can be exercised over this portion of the atmosphere. The height of the tallest structure in the world is 900 feet, but the fact that such a structure can be erected does not give to landowners a claim to proprietary rights in the whole column of air above their possessions. Actual appropriation, and not the possibility of appropriation, is the test of ownership, and, further, the thing owned must be capable of being reduced into permanent possession. In reality the property is in the things growing or erected upon the land; and speaking generally, it may be said that the air, which is changing continually, is incapable of appropriation.

The position adopted by our own municipal law is stated in the case of Pickering *v* Rudd, reported in the fourth volume of Campbell's Reports, page 220. Pickering, the plaintiff in the case, took exception to the proceedings of his neighbour Rudd in nailing up a board which projected a few inches over his (Pickering's) property. Pickering happened to have heard of the Roman law maxim quoted above, and, interpreting it to mean that he was the owner of the column of air above his holding *ad infinitum*, he proceeded to enforce rigorously what he regarded as his right. Accordingly he started his action, and Lord Chief Justice Ellenborough in the course of his summing up gave an opinion on this subject of aviation in the following words:—"I do not think," he said, "that it is a trespass to interfere "with the column of air superincumbent on the close. I once had "occasion to rule on circuit that a man who from the outside of a "field discharged a gun into it so that his shot must have struck the "soil was guilty of breaking and entering it. A very learned judge "who went the circuit with me at first doubted the decision, but I "believe he afterwards approved of it, and that it met with the "general concurrence of those to whom it was mentioned. But I "am by no means prepared to say that firing a gun across a field "*in vacuo*, no part of the contents touching it, amounts to a *clausum* "*fregit*. Now, if this board overhanging the plaintiff's garden be a "trespass it would follow that an aeronaut is liable to an action of "trespass *quare clausum fregit, i.e.*, for breaking and entering the "plaintiff's close, at the suit of the occupier of every field over which "the balloon passes in the course of his voyage."

From the foregoing argument it is clear that the upper air, like the open sea, cannot be the subject of proprietary rights; but it is open to the nations of the world to exercise a limited jurisdiction or sovereignty over certain portions of both these elements. The

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analogy of the sea to the atmosphere is in many respects a close one, and in no case more so than in the questions relating to those portions of the sea and of the atmosphere which immediately adjoin territory. It has long been a recognised doctrine of International Law that States are permitted to exercise a limited sovereignty or quasi-sovereignty over the waters which wash their shores. This distance was fixed, in the early part of the 18th century, at three miles. It is true that of late years there have been several indications of a tendency to increase this limit, and to make the authority of States over territorial waters more nearly conterminous with the range of modern artillery; but although so influential a body as the Institut de Droit International at its Paris meeting in 1894 approved of the idea of extending this jurisdiction to six miles, the three mile limit still holds good as a rule of International Law.

It is safe to say that the nations will exercise similar powers over the belt of atmosphere immediately dominating their territories, and this portion of the air will probably be known in the future, in accordance with the marine analogy as the " territorial air " or " territorial atmosphere " of States. The line of demarcation between the zone in which sovereignty is exerciseable by a State and the supra-territorial or open air, will not, however, be as easy to fix as in the case of territorial waters. The same general rule will in all probability be adopted, namely, the range of those guns which are now in process of preparation for use against airships. Modern gunnery has made remarkable progress during the past decade, and it will be interesting to note the distance which will be ultimately adopted as determining the limit of aerial jurisdiction.

The necessity for the establishment of a body of rules which will completely cover the " Law of the Air " may now be admitted. It cannot be doubted that neglect or delay might cause serious inconvenience in this matter. The security of States would be threatened if every endeavour were not made to place aerial navigation upon a satisfactory footing. In time of peace, forts, arsenals, Government stores and buildings would be sketched and photographed, the surface of each country and its defences would be reconnoitred and the sense of security would disappear. As progress is made in the art of aviation and airships become larger, persons infected with contagious maladies and undesirable aliens might be landed; while a new sphere of activity would be opened up for smugglers, and for anarchists new facilities of destruction.

In time of war, the consequences might be still more disastrous. In the absence of any regulations to the contrary, hostilities, though probably on a minor scale, might take place in the air over the territory of some unoffending neutral State. In dealing with this contingency the maxim of the old Roman lawyers suggests itself. "*Sic utere tuo ut alienum non lædas*"—*i. e.*, use your own in such a way as not to damage what is another's. This useful maxim may be extended for the present purpose in a manner of which the Roman lawyers would have approved:—"*Sie utere re communi ut alienam non lædas*";—*i. e.*, so use what is common to all as not to damage what is another's. The principle contained in this development of the original maxim carried great weight in the framing of the code of regulations by which the navigation of the ocean is controlled.

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The right of self defence, *primum vivere*, is the first and most natural right of every State. It is, therefore, always justified in taking any of the steps necessary for the safety and welfare of its population and territory. "Le droit de conservation," said M. Pradier —Fodéré in his Traité de Droit International, Public, Européen et Americain, " comprend tous les droits incidents essentiels pour sauve- " garder l'intégralité de l'existence tout ce physique que morale des " états; le droit de repousser tout ce qui peut empêcher sa propre " conservation et son développement, le droit d'éloigner tout mal " présent et de se prémunir contre tout danger de préjudice futur."

The analogies in this connection between the sea and the air cannot fail to strike even the ordinary student. The territorial waters of States correspond to the territorial air as above described; while the open sea corresponds to the open or supra-territorial air. In the latter case it is hardly correct to use the words " open " and " supra-territorial " as synonymous. It must be remembered that there is a difference between the " open " air over the open sea and the same element over the territory of a State. The former is not divided; the latter must be divided into the territorial and the supra-territorial or higher air. To avoid confusion, therefore, it is better to confine the phrase " open air " to that division of the atmosphere which is above the open sea and to use the phrase " supra-territorial " or " higher " air to describe that which is above the territorial atmosphere of the land. The principles and rules regulating aerial conflicts over the open sea may be easily settled; the main difficulties will arise in the framing of the code intended to control supra-territorial navigation in peace and war.

The similarity between the two elements is, however, not so marked when the question of levels comes to be considered. The sea is a plane surface, ships are all on one level, and the navigation of the waters is, comparatively speaking, a simple matter. Competent seamanship and proper care will generally prevent one vessel from doing any damage to another. Any such damage usually arises either from deliberate purpose, or from neglect of the common rules of the road, rather than from unavoidable accident. Damage to land, also, from ships at sea is the outcome of deliberate intention on the part of a vessel's commander. On the other hand, the navigation of the air will always be a more difficult business than the management of ships on the ocean, and the laws governing aerial transit will be proportionately more complicated. An airship can travel at any level where life is possible, and, except when actually crossing the high seas or travelling in the Polar regions, will be moving over the territories of one or other of the nations of the world. In addition to the usual dangers to the airships themselves from collision—in this case both vertical and horizontal—there is the other and graver danger of falling and causing injury to persons and property on the earth below. This latter, though far the most serious, is a danger against which it is not possible to guard, but it is a risk which will have to be run. All that can be done is to ensure that proper precautions are taken by airmen for the general safety. If such precautions prove insufficient, the only remedy is compensation.

It is not unreasonable to suppose that aerial contests of some sort will actually take place in the future. The question then arises

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as to the venue of such encounters. In ordinary warfare hostilities are limited to the open sea and to the territorial waters and territories of the belligerent States. These novel conflicts may of course take place in the corresponding portions of the atmosphere, *i.e.*, that overhanging the open sea and the territories and territorial waters of the belligerents. In other words the whole of the air above the open sea may be used generally both for peaceful and warlike operations, while the remainder or supra-territorial air above the territories and territorial waters of neutral States should be employed for peaceful purposes only.

A battle on the open sea does no injury to a third party unless indeed a neutral vessel sails into the zone of operations, a very unlikely contingency. But an aerial battle taking place in the supra-territorial or higher air stands on a different footing, and the damage done to a neutral by falling projectiles and disabled airships might be considerable. This suggests the rule that belligerent airships crossing the supra-territorial air of a neutral country, can under no circumstances while doing so engage in any hostile operation. This clearly marks the difference between supra-territorial air and the extra-territorial waters of the open sea. To sum up the position in a single sentence, the whole column of air above the territory of a neutral State is analogous from the juristic point of view to its territorial waters. Actual hostilities, therefore, must be confined to the air above the open sea and to that overhanging the territories and territorial waters of the enemy States.

Belligerents must also take into account the possibility of their projectiles falling within and doing damage to the territories contiguous to their own; for unless they fight their battles at some distance from such territories, it is not impossible or unlikely that considerable damage may be done. Here again the analogy to the territorial waters of neutrals in naval warfare becomes apparent, hostilities in the latter case being only permissible outside the three mile limit. In aerial warfare, a converse rule would appear to be the correct one, the belligerents being obliged to conduct their battles at such a distance *within* their own borders as to avoid any possibility of damage to neutral life or property.

The rules controlling the question of capture at sea occupy a not unimportant position in the maritime code, and a series of regulations of a similar nature will be required to govern the procedure in questions of aerial prize. The two cases are very similar. The public armed vessels of belligerents are *primâ facie* liable to capture or destruction by the enemy. Ships, the private property of individual subjects of the enemy State are liable to seizure and confiscation. This method of dealing with an enemy's property has always been maintained by Great Britain and practised in British naval wars. The reasons for holding this opinion are plain when the predominance of the British Navy on the high seas is taken into consideration. But foreign navies are now greatly increasing in power, and though the question is still entirely open, the opposite or Continental view is apparently gaining ground. The seizure of this class of enemy goods is productive of much hardship, and the advantage gained by the State which makes the capture is hardly sufficient to justify the injury inflicted upon individuals. This latter and sounder view will probably

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be adopted in maritime warfare, and should find a place at once in the code which regulates the aerial relations of belligerents.

It is not to be supposed for a moment that the adoption of this view as an established rule would preclude the armed vessels of belligerent States from the right of visit and search. Any vessel, whether the private property of an enemy or of a neutral, is liable to be visited by the armed vessels of a belligerent. Actual visit and search in the air might be a matter of difficulty, but an airship flying over belligerent territory might be forced to descend for the purpose of inspection of papers.

The collection of information by means of airships will be a matter of vital importance in the conflicts of the future. No better method of obtaining a bird's eye view of the theatre of operations can be devised than this, and the perfect dirigible should have no difficulty in carrying out its mission, which hitherto has been somewhat imperfectly achieved by captive and non-dirigible balloons. It is not too much to say that an airship could do as much in a day in this direction as an ordinary cavalry force could accomplish in a week. In addition to the ordinary information which could be brought in to headquarters, a smart aeronaut armed with "le dernier cri" in photographic apparatus is a factor not to be despised by the officer commanding a force in the field.

A certain amount of discussion has already taken place on the question of the treatment to be meted out to an aeronaut if caught when "spying out the land." A spy has been defined as a person whose operations are conducted secretly and in disguise, and he is liable in case of capture to an ignominious death by hanging. An attempt was made by Germany during the Franco-German War to treat as spies persons traversing the German lines in balloons; the aeronauts in this instance were deported to Prussia under suspicion of being French spies. Count Bismarck was of opinion, in the case of an English subject captured in a balloon, that apart from the fact that he was suspected of being engaged in the carriage of illicit correspondence, his arrest and trial by court martial "would have "been justified, because he had spied out and crossed our outposts "and positions in a manner which was beyond the control of the "outposts, possibly with a view to make use of the information thus "gained, to our prejudice." As secrecy and disguise are manifestly impossible in the case of an aeronaut in a balloon, it is hard to understand the attitude adopted by the Germans on this point. The Declaration of Brussels of 1874, which was never adopted, forbad that airmen should be treated as spies, and the Manuel de Droit International, issued by the French Government for the use of its military officers contains a paragraph to the same effect:—". . . . . "On doit regarder comme belligérants réguliers les individus qui "partent en ballon pour transmettre des dépêches et entretenir des "communications entre les parties de l'armée ou du territoire séparées "par l'ennemi. Il sagissent ouvertement et sans perfidie; on peut "tirer sur eux au passage; rien n'autorise, par conséquent à les "assimiler à des espions ou à des traîtres. Mais comme ils accomplis-"sent un acte d'hostilité en forçant les lignes ennemies par la voie "aérienne, on est fondé à les garder comme prisonniers de guerre et "à s'emparer de leurs correspondance." Under no circumstances,

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therefore, is it possible to regard an aeronaut as a spy, as the very attributes which constitute espionage are wanting.

When that intrepid Frenchman, M. Blériot, landed in England on the occasion of his flight by aeroplane across the English Channel, he was solemnly visited by the Customs officials at Dover. The visit of these officers was, of course, treated rather as a joke, but it suggests the necessity for a properly organised system of aerial customs, if this method of transit should become general. Even at the present moment there are airships of considerable carrying capacity in existence, and the institution of a department to control their arrival within the borders of the different States is really only a matter of time. These customs stations should not only be constructed on the borders of a State's territory, but should also be placed in suitable positions in the interior. The air, even more than the sea, is subject to frequent storms, and in many cases it might not be possible for an airship to descend at the frontier station. These inland stations are suggested for the purpose of dealing with airships driven out of their course by stress of weather, or unable to descend on the frontier on account of some accident or other good reason. The manner, however, in which aerial navigation will ultimately be controlled in this respect, and the form which the customs stations will take are matters for future settlement; but it is not too early to make a few suggestions, which are advanced by the writer with some diffidence.

First, as to the outward and visible form of an aerial customs station, it is suggested that a tower, sufficiently lofty to be easily picked out from among other buildings by the aeronaut, and painted in remarkable colours, should be an essential to every one of these stations. It should further be equipped, after the fashion of a lighthouse, with strong electric light, so as to be discernable in the darkness. It would not, of course, be desirable that an airship should anchor in the air alongside the tower, but such a tower would be a suitable means of attracting the airman's attention, and he should be obliged to land in its immediate vicinity, if called upon to do so. The most modern signalling apparatus should be a *sine quâ non* for these institutions, and the instalment of wireless telegraphy in each would also be desirable and conduce to their general efficiency.

The whole question of the State supervision of the navigation of the atmosphere falls naturally into two divisions; viz., the procedure to be employed in time of peace and, secondly, in time of war. It is clear that airships coming into a country must be subject to the usual regulations of the Inland Revenue with regard to vessels arriving in port. It is, therefore, the duty of the Revenue officers on the arrival of an airship in time of peace to pay it a visit, and to ascertain that it is not employed on any service calculated to endanger the security of the country. In the case of a privately owned vessel, the customs officers have the right of search, should they consider such a course to be necessary. In the event of any infraction of rules or suspicious conduct on the part of the aeronauts, the local tribunals should have power to deal with the case in accordance with the ordinary law. If the incoming airship is a public vessel, *i.e.*, owned by a foreign State, it should be free from visit and inspection. The word of honour of the commander should be taken as sufficient, as a close inspection is

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not in accordance with international practice. But should the public airship be guilty of any breach of faith or infringement of the Law of Nations, or of the law of the State upon whose territory it has descended, then recourse must be had to the diplomatic departments concerned for the purpose of obtaining redress.

The question next arises how far, in the event of the vessel's papers being found to be satisfactory in every respect, the duration of its stay in the foreign country should be limited. With regard to this, the same rules may be applied which hold good in the case of sea-going ships in foreign ports and harbours. There is no objection to a private vessel remaining as long as its owner is content to pay the port dues which in the case of an airship will no doubt be fixed at a high rate. The stay of the airships belonging to foreign States should be as brief as possible, unless they are specially authorised to remain by the home country. It would be expedient also that States should neither despatch into other countries, nor receive within their own borders, vessels of this class in large numbers. If permitted to remain, the personnel of these airships must, as a matter of course, abstain from any acts contrary to the laws or peace of the country, and the local authorities should be held responsible for proper supervision, and for the extent to which the foreigners are allowed to mix with the inhabitants. On taking its departure an airship, whether belonging to private individual or to State, must conform to the local rules and regulations.

As regards belligerency, the subject may be conveniently treated under three different heads, viz:—

1. Belligerent airships within the jurisdiction of the enemy.
2. The visits of neutral airships to belligerent territory.
3. The visits of belligerent airships to neutral territory.

As to No. 1:—The airship of a belligerent, whether public or private, on or above the enemy's territory must, like the enemy's vessels in the open sea, be deemed liable to capture. The former may be taken as a matter of course, and their occupants detained as prisoners of war being public enemies of the State; the latter vessels come under the same rule as that which obtains in maritime warfare, namely, that enemy property under enemy flag is liable to capture. The tendency of modern opinion is to exempt from seizure private property at sea, but nothing definite has yet been done in this direction, and as long as Great Britain maintains the opposite view, the existing rule must prevail. Following the same analogy, passengers and merchandise belonging to neutral States and non-hostile in character, but on board enemy airships must be respected, and vessels engaged in transporting wounded or sick would come within the same category.

(2). Neutral airships on or above belligerent territory.

The relations between belligerent and neutral States being entirely pacific, the rules governing the visits of airships in time of peace are applicable to neutral vessels coming to earth in a belligerent country, and to none more so than to the public vessels of the neutral State. In war time, neutral private airships may possibly be subjected to a more rigorous supervision, their landing will in all probability be covered by express authority granted by the belligerent

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State, and it is possible that the neutral visitor may be required to ask by signal for permission to descend. Further it is not unlikely that the belligerent may place a limit on the number of private airships landing on its territory under these conditions. But apart from these restrictions, liberty of commerce will remain as in time of peace, and neutral vessels will be respected with the two recognised exceptions of those engaged in the carriage of contraband of war or in unneutral service. This, according to the Declaration of London of 1909, consists in:—

(i.) Carriage by agreement of "individual passengers who are embodied in the armed forces of the enemy" or "of intelligence in the interest of the enemy."

(ii.) Carriage within "the knowledge of the owner, the charterer, or the master" of a military detachment of the enemy, or "of one or more persons who in the course of the voyage directly assist the operations of the enemy."

(3). Belligerent airships on or above neutral territory.

Here again a state of peace exists between the neutral country in whose territory the airships alight and the belligerent State. Privately owned airships of the belligerent which form no part of the enemy's forces should be permitted to descend under the same conditions as if no war existed, and they should be subject to regulations similar to those which govern the analogous case of trading vessels at sea. But can the same indulgence be extended to the public airships of the belligerent parties? Again following the parallel suggested by the rules of the maritime code, it would seem not. The territorial State in its character as a neutral is under a two-fold obligation to the combatant Governments; *i. e.*, to show absolute impartiality in its dealings with each of the belligerents, and to abstain from giving any help calculated to increase the fighting efficiency of the forces on either side.

The rules to be formulated for international guidance in these important matters will require the utmost consideration and care. Unless these questions are fittingly covered by established rules, international complications will surely ensue. In ordinary land warfare, the troops of the belligerents who penetrate into or take refuge in a neutral country are interned there and detained until the termination of hostilities. At sea, the conditions are somewhat different. The public armed vessels of the combatants which enter neutral ports are, save under exceptional circumstances, not only at liberty to take their departure, but bound to do so within a limited period. The case of such a vessel pursued by the enemy and taking refuge in a neutral port has of late years given rise to some difficulty. The provision of the Hague Convention (1907) on this point runs as follows:—"If, notwithstanding the notification of the neutral Power, "a belligerent ship of war does not leave a port where it is not "entitled to remain, the neutral Power is entitled to take such "measures as it considers necessary to render the ship incapable of "putting to sea so long as the war lasts, and the commanding officer "of the ship must facilitate the execution of such measures." Mr. T. J. Lawrence's comment upon this is "Surely a strict obligation to "intern should have been laid on the neutral Government when one "belligerent flouts its authority to the detriment of the other." As

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a conflict in the air bears a more striking similarity to a maritime encounter than to a land battle, it is on the rules governing the former of the two cases that future legislation in this direction will probably be based. It must not, however, be forgotten that these rules are gradually approximating to those which regulate the treatment of belligerent forces crossing into neutral territory. The military airship, in common with the ironclad at sea, is sometimes far away from the depôts containing the food and fuel so necessary to its existence, and frequent communication with its source of supply will be even more necessary on the part of the aerial vessel on account of its limited carrying capacity. Should a belligerent airship be compelled to land in neutral territory, it should be required to depart at the earliest possible moment. The amount of assistance which may be given by a neutral in these cases would be strictly limited, and should in no case amount to a real aid in the prosecution of the war. All that an airship in difficulties can expect is the succour demanded by the claims of humanity, or due as a matter of international courtesy. It cannot, for instance, expect to be allowed to make perfect its materiel, or repair its guns. The usual procedure adopted in similar circumstances at sea is that permission is given for the vessel to take in sufficient supplies of food and fuel as will enable it to reach the nearest port of its own country or that of an ally. A procedure akin to this would be applicable in the case of aerial navigation.

The landing of two airships belonging to States at war with one another at the same place on neutral territory may be, perhaps, an unlikely contingency, but when the element in which these vessels operate is taken into consideration such an occurrence is by no means impossible. In an event of this kind, hostilities within the neutral's jurisdiction must be entirely suspended, in accordance with the rule which governs the position when belligerent vessels meet in a neutral port. Here, as in other instances, the analogy presented by the maritime law may be applied with advantage. The latest regulations on the subject are laid down in the proceedings of the Hague Conference of 1907, which have, however, not yet been ratified. Articles 15 and 16 of the Convention respecting the Rights and Duties of Neutral Powers in Maritime War contain the following provisions:— That " In default of special provisions to the contrary in the laws of " a neutral Power, the maximum number of warships belonging to " a belligerent which may be in one of the ports or roadsteads of " that Power simultaneously shall be three."

That " When warships belonging to both belligerents are present " simultaneously in a neutral port or roadstead, a period of not less " than twenty-four hours must elapse between the departure of the " ships belonging to one belligerent and the departure of the ships " belonging to the other."

" The order of departure is determined by the order of arrival, " unless the ship which arrived first is so circumstanced that an " extension of its stay is permissible."

" A belligerent warship may not leave a neutral port or roadstead " until twenty-four hours after the departure of a merchant-ship flying " the flag of its adversary." It is not likely that a larger number than three such airships would require at any time the hospitality of a neutral State. As to the time intervening between the departure of

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hostile vessels in the case of airships, it is clear that so long an interval as twenty-four hours should not be necessary; ten would be amply sufficient.

The next point of importance is the question of the treatment of belligerent airships arriving in a neutral country and having on board wounded, sick, or prisoners of war. The latter may be kept on board the vessel which captured them, but if they escape they may not be pursued by their former captors. The best and most humane way of dealing with the sick and wounded is to transfer them to the hospitals of the neutral. But they should not be allowed to serve again during the existing war if they avail themselves of this privilege; they should be deemed to be interned in the neutral State, where they should be detained at the belligerent's expense until the termination of hostilities.

The Convention on Neutral Rights and Duties in Maritime War deals also with the question of prizes brought into neutral ports. It is questionable whether a belligerent airship, *i.e.*, a portion of the military forces of the enemy, should be permitted to land at all on neutral territory. According to the strict analogy of hostilities on land such an expedition should be interned in the neutral country. If, however, the position of the airship should be deemed similar to that of a man of war entering a neutral harbour with a prize, then it is suggested that the rules applicable in this event should be adopted, with appropriate modifications, in cases of aerial capture. The words of the Convention are as follows:—"A prize may only "be brought into a neutral port on account of unseaworthiness, stress "of weather, or want of fuel or provisions. It must leave as soon "as the circumstances which justified its entry are at an end. If it does "not, the neutral Power must order it to leave at once; should it fail to "obey, the neutral Power must employ the means at its disposal to "release it with its officers and crew and to intern the prize crew."

The trend of opinion among international lawyers is against the use by belligerents of means of destruction which cannot be entirely controlled by the warring States. Though as yet no definite rule has been formulated, the question as to how far the use of mines at sea is permissible was discussed at some length at the Hague Conference (1907). The Russo-Japanese War drew the attention of the civilized world to the dangers resulting from the indiscriminate sowing of floating mines in the ocean, which, if the war had taken place in more frequented waters, would have involved consequences to neutrals even more serious than they were. At this Conference, the Chinese delegate made the following declaration:— "The Chinese Government is even to-day obliged to furnish vessels "engaged in coastal navigation with special apparatus to raise and "destroy floating mines which are found, not only in the open sea, "but even in its territorial waters. In spite of the precautions which "have been taken, a very considerable number of coasting vessels, "fishing boats, junks and sampans, have been lost with all hands "without the details of these disasters being known to the western "world. It is calculated from five to six hundred of our countrymen "engaged in their peaceful occupations have there met a cruel death "in consequence of these dangerous engines of war."

This illustrates effectively the indiscriminate damage which these

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instruments of warfare may do to life and to the property of neutral States, not only during the actual war, but also for years after its conclusion. The laying of mines in the open sea should be forbidden, and this course was very stoutly advocated by the Colombian delegate at the Conference, M. Triana, who in an eloquent and telling speech, pointed out the results of the indiscriminate use of this method of warfare. He was strongly supported by the British delegate, Sir Ernest Satow, but their view encountered the opposition of the German representative. But appealing as it did to feelings of humanity and to common sense, it is more likely to be accepted by the nations of the civilized world.

Similar possibilities arise in the prosecution of hostilities in the air. The use of "Ballons-sonde" (papier maché balloons of small dimensions) and "Ballons libres non montés" (balloons having no aeronaut) is at present confined to the scientific investigation of temperatures at various levels, and to the analysis of the air at altitudes where life is probably impossible. But in the absence of legislation there is nothing to prevent the use of these vessels as instruments of destruction, and the amount of damage they could do would be difficult to estimate. The similarity to the marine mine is complete if an infernal machine is attached to the car of the balloon which will explode on contact with any solid substance or by a time arrangement. The difference between the air mine and the similar instrument in the ocean is that the former can be seen and the latter cannot. But in spite of this, the sense of security would be much diminished if these air-craft were permitted to roam the heaveans to an unlimited extent. How pleasant for the householder with whose chimneys a "ballon-sonde" might collide in the middle of the night!

This class of airship would apparently come within the terms of the Declarations of 1899 and 1907, alluded to above, whereby the dropping of projectiles and explosives upon the heads of the people on the earth is forbidden. These Declarations, having been but temporarily accepted by some of the Powers and rejected by others, have no binding force. It is open to the non-signatory Powers to carry on a conflict by this means, and in the case of a war between two States, one of which has accepted the terms of the Declarations while the other has refused assent, both parties would be justified in using this means of destruction. Public opinion, however, would probably be opposed to this method of carrying on hostilities.

The Declarations alluded to in the preceding paragraph do not in terms cover the case of these free balloons and these engines of destruction should be made the subject of a special prohibition. The damage which they could perpetrate is not confined to the dropping of explosives and, incidentally, the machines themselves upon the earth below; it would be easy for them to break, though more by accident than design, other rules of international law which are now in actual operation. It is an established rule that churches and hospitals, wherever placed, are not liable to bombardment, and undefended towns and villages are included in the same category. An airship without an airman is the plaything of the winds, and it is a mere chance whether the vessel comes down among the enemy's forces or alights on some building or enclosure neutralised by the Convention of Geneva. A further and still more serious consequence

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of the free use of air mines is the possibility that the vessel might not come down at all in the enemy's country, but might drift over a neighbouring territory, whence injury might ensue to the neutral and difficult complications might arise between the two States.

The necessity for early legislation on the subject of projectiles dropped from airships, whether controlled or not, cannot be too strongly emphasized. As illustrating the progress which is being made by the inventors of aerial ships and weapons, the following extract from the *Daily Mail* of August 10th, 1910, may be of interest. The article in question is headed "Bomb throwing by airmen"; the occasion was the aviation meeting at Lanark. Mr. Grace and Mr. Ogilvie, two of the aviators at the meeting, attempted to drop an orange from a height of from 60 to 100 feet upon a small space marked out on the ground to represent the target. The former of these two gentlemen managed to get within 23 feet of the mark at the third attempt. M. Norbert Chereau, M. Blériot's manager, who witnessed the trials, said to the newspaper's representative:—"To "be comparatively safe from the enemy's fire in war time, an aero- "planist upon a destructive mission would need to release his bombs "from a height of at least 2000 feet. Seeing that neither Mr. Grace "nor Mr. Ogilvie could hit the target from a height of less than 100 "feet, the difficulty can be imagined of dropping a bomb with any "degree of precision from 2000 feet. Assiduous practice will be "necessary before an army airman can let fall a projectile from any "great elevation with an effective aim.

"An automatic tube is, I hear, now being prepared so as to allow "an aeroplanist to release a series of bombs, while flying, merely by "the pressure of a foot pedal, besides giving him complete freedom "with his hands. This apparatus will greatly increase the pilot's "chance of hitting his mark. When, for example, he is flying at "the rate of 40 miles an hour towards a fort which he seeks to "destroy, he will commence releasing bombs very quickly one after "another when he is still 100 yards or more from his mark. The "projectiles would thus fall forward in a line, one in front of the "other until one of them was carried directly on to the roof of the "fort. Tests with this device are likely to take place quite soon." The article concludes with plans for further tests to be carried out by Mr. Grahame White from a height of 2000 feet, the target being the outline of a Dreadnought traced upon the ground.

It is understood that official experiments to test the practical value of aeroplanes as despatch carriers in war time will shortly take place. Even now it may be said that this method of communication is as reliable as the means usually available in the field, and it has the advantage of far greater speed. Moreover, they can now rise to a height out of the range of artillery and have sufficient stability to enable them to fly in winds up to thirty miles an hour. That Continental Governments have not been slow to recognise how vitally important these machines have become to modern armies may be inferred from the following words of Mr. V. Ker-Seymer, who has organised many of the English flying meetings:—"In France, Italy "and Russia, regular corps of officers are learning to fly, and these "Governments are buying aeroplanes of all types. In France one "now sees flights almost every day by officers in uniform—one steer-

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" ing the aeroplane and the other practising observation work." Nor is the use of the aeroplane in this direction likely to be confined solely to the land forces of the States; it may become of equal service to navies. One of our most famous flyers has given his opinion on this point as follows:—". . . . every warship should now have its aero-" plane. I am sure that I could rise in my biplane from the deck " of a warship and return to it again after a reconnoitring excursion."

In conclusion, it is hoped that the foregoing pages have made clear two important points. First, the impossibility of the atmosphere ever becoming the subject of proprietary rights. The air, like the sea, was intended for the enjoyment of all, and by reason of its vastness and intangibility is incapable of being reduced into possession by any particular race or nation. The juristic idea of sovereignty consists in the control and exercise of power over a certain thing. Should a nation claim jurisdiction over a large tract of air, this would necessitate the maintenance of a force of aerial police sufficient for its proper regulation and control—a practically impossible task.

Secondly, the urgent need for a full and sufficient body of rules to govern aerial navigation whether " innocent " or the reverse. An attempt has been made in this article to point out a few of the international dangers and difficulties which may arise if this novel branch of international law is not worked out and established. The airman of the future, assuming that the science and art of aviation advance at the present rate of progress, will be able to do unlimited damage if his movements are not subjected to proper supervision and restriction, for his opportunities for mischief are numberless. The nations of the world would be well advised to frame codes of municipal aerial laws also, so as to control aviation within their respective jurisdictions, and to prevent this new science being turned to account by the criminals and malefactors who are at present in every community. With this branch of the subject, however, we are not immediately concerned.

The times in which we live are curious, and events are moving fast. What boy or girl reading the Laureate's dream of what might happen before universal sovereignty had brought about universal peace, could have dreamed that the splendid fantastic vision might within his or her own lifetime come within measurable distance of accomplishment.

" For I dipt into the future, far as human eye could see,
" Saw the vision of the world, and all the wonder that would be;
" Saw the heavens fill with commerce, argosies of magic sails,
" Pilots of the purple twilight, dropping down with costly bales;
" Heard the heavens fill with shouting, and there rained a ghastly dew
" From the nations' airy navies grappling in the central blue:
" Far along the world-wide whisper of the south wind rushing warm,
" With the standards of the peoples plunging thro' the thunder storm;
" Till the war-drum throbb'd no longer, and the battle flags were furl'd
" In the Parliament of man, the Federation of the world."

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It is clear that there is need for the consideration of these matters and for the construction of a Code of International Rules to cover this novel method of navigation. The time is also fitting, and this is among the reasons why a series of regulations should be formulated without undue delay. The existing rules of international law which are embodied in various Conventions and Declarations, though more or less accepted by the nations of the civilized world, are not universally binding. They have been hammered out during the course of centuries by a slow and painful process. Difficulties have arisen out of the fact that two different schools arose, known as the Anglo-Saxon and the Continental, which adopted opposite views on many important points. Differences of opinion frequently arise out of incidents which happen in time of war, and each belligerent naturally supports the view suggested by its own advantage, which is that of the School to which it belongs. The result is that all these Conventions and Declarations are based on compromise; many States, therefore, refuse to adopt them, or portions of them, being unwilling to abandon their long-cherished opinions. The first serious attempt at codification may be said to have been the Declaration of Paris, but this being an exposition of principles rather than an effort of precise legislation, left many points untouched and unsettled. It was a compromise of vital importance in two ways—as an example set to the nations and by reason of the magnitude of the interests involved. The British abandoned their long-cherished doctrine, dating from the time of the *Consolato Del Mare* (a code compiled at Barcelona probably in the fourteenth century), that it was legitimate to confiscate enemy cargo found in a neutral or friendly vessel. Continental nations in return surrendered their established principle that the ownership of the vessel decided the fate of the cargo. Every Convention and Declaration drawn up since then has been a compromise, and the codes which the learning and intelligence of the delegates have produced have been objected to on various points in different quarters.

Why, then, should not a Jurisprudence of the Air be established before any different lines of thought or divers schools have come into existence? It is also fitting that the British nation, which has taken so marked a lead in these matters, should take the lead in framing this new series of rules. A code such as this produced at the present moment would be a marked stage in the historical development of international progress, and a step in the direction of that great Parliament of man, which for international purposes will direct the federation of the world.

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British and French Q.F. Field Artillery.

By MAJOR C. E. D. BUDWORTH, M.V.O., R.H.A.

A study of French Q.F. field artillery—its organisation, equipment and procedure—is probably more interesting than that of any other country.

The French were the first Nation to adopt Q.F. field guns, and a considerable time elapsed before the eyes of other nations were fully opened to the importance of the change involved.

The French Q.F. field gun, although dating its existence from before the South African War, is still in many respects equal to, and in some respects the superior of, the more modern Q.F. field equipments.

French artillerists have remained imbued with the idea that the advantage of a Q.F. gun lies principally in its power of developing an overwhelming storm of bullets in a short space of time. "La rapidité du tir, qui est la propriété essentielle du canon de campagne . . . ." "Règlement de Manœuvre de l'Artillerie de Campagne."

It has been their constant endeavour to promote a "School of Fire" based on this, as they consider, essential property of their gun.

Guided by their own or French experience with Q.F. field guns, other Continental Nations have already assimilated or are in the course of assimilating their general methods of fire to those of the French.

Should we in the near future find ourselves engaged in civilized warfare, it is with Q.F. artillery employing methods of procedure resembling those of the French, that our cavalry, artillery, and infantry officers may quite likely find themselves called upon to cope.

Our artillery differs widely from that of the French in many respects.

My purpose is to consider where we principally differ, why we differ, and what we have to learn from a study of French artillery

The vital difference.

A study of British and French artillery training books discloses a wide divergence of views as to the employment of artillery in one very important respect.

The "Règlement de Manœuvre de l'Artillerie de Campagne," contains 28 examples of artillery action in dealing with hostile troops.

In only five cases does the range equal or exceed 3,000 yards.

In only two cases, viz., "firing at balloons," and "firing at very long range," does the range equal or exceed 4,000 yards. The average range is 2,840 yards approximately.

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Our "Field Artillery Training," contains some 16 examples of field guns dealing with hostile troops.

In only a single instance is the range below 3,000 yards, and in 10 of the 16 examples the range either equals or exceeds 4,000 yards. The average range is 4,060 yards approximately.

The only example in which the two books may be said to agree is "firing at balloons," viz., French, 4,200 yards; British, 4,300 yards.

Here then we have at once the vital difference which will be found always recurring, whether it is a question of "Organization," "Equipment," "Ranging," "Methods of Fire," "Fire Tactics," or "Training."

ORGANIZATION.

A French battery consists of 4 guns and 12 wagons commanded by a Captain.

A brigade, of three 4-gun batteries commanded by a Major.

I purposely avoid all question as to the relative merits of 4 and 6-gun batteries.

It is necessary, however, to call attention to the large number of ammunition wagons (3 per gun) in a French battery. This is necessitated by the methods of ranging and fire employed.

All those French officers with whom I have spoken on the subject concur in stating that their methods of ranging and fire would be too expensive in ammunition if applied to a 6-gun battery —this would certainly seem to be so, and if true of a French shell (under 16lb.), how much more so of ours (over 18lb.)!

EQUIPMENT.

A. Muzzle velocity and weight of shell:—

The muzzle energy of the French field gun apparently does not much exceed our own—but there is a vital difference in the use made of it.

Muzzle energy being the product of weight of shell multiplied by velocity squared, we have our own choice as to what relative value we shall ascribe to these two factors.

The most notable point about our 18-pr. Q.F. equipment is the weight of shell fired—far exceeding that of any other field artillery.

The French fire a shell somewhat less than 16lb. in weight while ours is 18½lb.

French muzzle velocity is, therefore, considerably greater. This I read to be 1740 f.s. to our 1590—I should myself adjudge the difference to be even more.

To discuss at length the relative value of weight of shell and muzzle velocity would be useless on my part, since experts differ widely in opinion.

All that is here necessary to say is that it is a generally accepted opinion that there is a point of range up to which high initial

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velocity and light shell have the advantage, and that above this point of range small initial velocity and heavy shell take precedence.

I think that it would be generally accepted that at a range of 2,840 yards the French gun had the advantage in this respect and that at 4,060 yards the position was reversed.

Apparently, therefore, British and French guns suit the two nations' respective ideas of artillery fighting ranges.

In order to appreciate French methods of ranging and fire, we must carefully bear in mind that, at the ranges which the French have principally under consideration, their gun trajectory is flat and bullet cone far reaching, and that at these ranges, the French gun is favourably constituted for obtaining direct hits on equipment with high explosive or percussion shrapnel shells. It should be noted also that the French employ heavier shrapnel bullets than we do.

B. Rapidity of Fire:—

I believe all those who have had an opportunity of watching our own and French artillery firing concur in thinking that French artillery is capable of firing the more rapidly.

Why is this? I ascribe it largely to three causes:—

1. Thanks to the provision of an automatic fuze setter, the preparation of French ammunition exceeds in rapidity the service of the gun. With us it cannot keep time with it.
2. The French gun is the steadier in direction. This is due to two causes—firstly, the gun after firing returns to the firing position more quietly than ours does. This is owing to the superiority for the purpose of compressed air over springs. Secondly, the French gun is anchored (abattu) in action. The result of these two factors is, that less relaying is required.
3. The French system of traversing the gun works more quickly and smoothly than ours does, and unlike our own does not augment the unsteadiness of the carriage when considerable traverse is given.

With regard to the above three causes:—

We should and can find a means of quickening the preparation of our ammunition, either by the introduction of hand fuze setters or an automatic fuze machine; though in connection with this the problem is rendered more difficult for us by the nature of our "Corrector" scale, weight of shell, and ideas as to range.

In considering any new equipment the system of French buffer and axial traversing gear should be borne in mind.

The French system of "anchorage" is not, I think, to be recommended, owing to difficulties caused in rapid switching and in dealing with targets moving across the front.

If we bear in mind relative ideas as to range, it is evident that, great rapidity of fire is more important for French than for British artillery.

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C. The Wagon:—

French wagon bodies are always unlimbered in action—teams are never unhooked—this is a great advantage; we can do the same but our wagon bodies only contain about half the number of rounds (i.e. 38 to 72).

D. General:—

It is unnecessary to dwell on other points of dissimilarity. French equipment wheels are much smaller than our own—this is purely a question of mobility with regard to possible field of operations.

The equipment is painted light blue.

The flash on discharge is as conspicuous as our own and more dust, &c., is raised by the blast.

The French gun has more "Jump" and the spade and even part of the trail become buried deep in the ground after firing several rounds.

With the introduction of a panoramic sight our sighting gear will compare favourably with that of the French.

The brake gears are very similar.

The French ejector ejects the cartridge case with considerable force.

The amount of traverse obtainable with the traversing gear is slightly less than our own.

The French equipment is the more easily man-handled.

E. Ammunition:—

What is the French shell? I do not know.

As I saw it fired, it produced on bursting a dense cloud of smoke. I was informed that use was made of this to interpose a curtain of smoke between friendly advancing infantry and hostile guns and rifles.

Of what value are such shells?

How would our action be affected if we were called upon to deal with hostile artillery utilizing such ammunition?

These are questions which, in my opinion, are well worthy of careful consideration.

So far as I know the use of such shells by hostile artillery in war would come to the majority of us as a complete surprise.

With regard to fuzes, the French with their ideas as to range are not faced by the same difficulties as we are.

I have no reason to suppose that French fuzes are superior to our own.

F. Graduations, size of handles, &c.:—

Before leaving the subject of equipment, I will refer to one matter in which the French have a distinct advantage over us.

It may appear a small matter, but it is not really so, more especially in view of the standard of training possessed by men who may be called upon to supplement the detachment in time of war.

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All sights, fuze machines, fuzes, &c., are very clearly marked with big clear figures and graduations.

All the handles, levers, &c., of equipment are large and easily manipulated.

4. RANGING.

Our methods of ranging vary somewhat according to circumstances, but if called upon for a general description, I think that it would be fair to state that:—

We generally employ a section of guns, firing percussion or time shrapnel at an interval varying between 5 and 20 seconds.

We endeavour to obtain a bracket of about 300 yards and to reduce this bracket to one of 100 yards and verify the two ends of it. We then try to obtain the correct elevation line and fuze for each gun, with the one and only object of destroying the hostile target as soon as possible.

Now the French system of ranging, like our own, may be modified according to circumstances, but if we are to understand the general idea underlying it we must realise that, unlike ourselves, the French have a *double object* in view.

Their first object is to obtain a start of the enemy, to upset his dispositions and the smooth working of his fire discipline, and render it difficult for him to range methodically.

Their second and ulterior object is, having thus obtained a "lead" over the enemy, to tighten their grasp upon him by more accurate shooting and to throttle him.

Their first endeavour is to enclose the target in a 440 yard bracket.

The French range with all four guns, firing time shrapnel at the same elevation in quick succession. A bound forward or back of 440 yards is then made and four more rounds are fired.

If the target is thus bracketed four rounds are fired at the intermediate elevation.

A very rapid searching fire is then commenced at the lower elevation of the 220 yard bracket thus established and continued at the middle elevation of this bracket.

At each elevation two rounds per gun are fired with great rapidity.

The rapidity with which all this is carried out is astonishing, but one must never forget the ranges (average 2,840 yards) under consideration.

I think that it is evident:—

1. That the system is much quicker than our own.
2. That the expenditure of ammunition involved would be prohibitive for a six-gun battery.
3. That the system is more applicable to 2,840 yards than to 4,060 yards.

Whether it is preferable to be content at first with only a partial accuracy or aim, as we do, for absolute accuracy from the outset is a matter of opinion.

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The whole of our system depends upon the observation of single rounds, and the personal equation of the value of the battery commander as an observer of fire, bulks much larger with us than it does with the French.

Hence the importance rightly attached to training our officers to shoot in their youth.

Granted for a moment that French ideas (2,840) of range are more correct than ours (4,060) perhaps the most interesting point to note is that French equipment lends itself far better to this rapid system of ranging with a wide bracket than our own does.

Hence if someone were to rise and say "French methods of ranging are superior to yours, adopt them," the reply might well be "you may or may not be right, but it is quite certain that you should have told us this before our gun was built, it is too late now, these methods are not equally applicable to our equipment."

Our endeavour should be to arrive at effective fire as quickly as possible, and in conjunction with this we must not overlook the importance of "time" shrapnel ranging.

It is sometimes assumed that the sole advantage of ranging with time shrapnel is to avoid rounds being lost to view in hollows, on marshy ground, &c.

This is not so.—Against a target which can hit back it is important to fire "effective" rounds as early as possible and a shrapnel which is "effective" early in the combat is likely to be of much more value than an equally well placed one later on.

I do not advocate time shrapnel ranging on all occasions.

In dealing with fleeting opportunities, when observation is easy and the target is one which cannot hit back, it is often preferable to range with percussion.

We must not, however, leave out of account the action of our opponent.

I have no idea whatever of criticising our training books, but I cannot help occasionally picturing to myself what would be the result of Ex. 16 in our "Field Artillery Training," if the opponent happened to be a battery trained in the French school, with guns of high muzzle velocity firing, perhaps, smoky shrapnel.

5. Methods of Fire.

The great difference between our own and French procedure is due to the constant effort of the French to treat their gun as an automatic machine for rapidly covering a zone of ground with a hail of bullets.

That our ideas are very different is clearly demonstrated by the fact that we have recently eliminated from our "Field Artillery Training" our only rapid method of searching an extent of ground with bullets.

We still possess a rapid method (sweeping) of distributing our fire over a broad front.

There is no comparison between the rapidity with which a depth of ground can be searched with bullets, under a system by which rounds are fired at successive elevations previously known to all

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ranks, and that under a system by which a commander is forced to order every successive change in elevation.

The reason for the divergence between our own and French views is quite evident.

These mechanical systems of fire are far better applicable to 2,840 than to 4,060 yards—the French equipment is far better suited to them—and indeed the expenditure of ammunition entailed is generally prohibitive for a 6-gun battery, firing rounds weighing over 18 lbs.

Officers of the other arms, however, should understand that they must not gauge the volume of fire which can be developed from Q.F. guns trained in the French school by what they see on our own practice ground.

6. Fire Tactics.

The French as a rule occupy positions behind cover, but this nearly always means positions just behind the crest. Why is this? The reason is the same as before. If batteries are operating at 2,840 yards, the battery commander must (according to the present system of working) be near his battery, so that he can readily control it, and deal with moving targets.

In addition to this, with a gun of high muzzle velocity, at comparatively short ranges, the question whether the trajectory will clear the crest is always liable to arise.

It is true that communication, whether telephonic or visual, is not practised in the French artillery to the same extent as it is with us—but the real reason is one of range.

Consider our own procedure at practice camps and elsewhere. At 4,060 yards we occupy positions very often far removed from the crest. When we move into what we consider comparatively close ranges, such as 2,840 yards, we are at any rate generally handy to it.

Above I have written "according to our present system of working," because I think that in the future we are likely to develop the system of directing fire by means of an officer pushed to the front with a telephone.

Now, when watching French artillery in action, one is struck by the general simplicity of the procedure employed—the absence of Rangetakers, Signallers, Telephonists, directors, &c.—the rapidity with which the fire is directed from one objective to another.

Why is this? Because the ranges are short, the Battery Commander is close to his battery, the unit is only a 4-gun battery, and all procedure, given the position of the battery close to the crest, is enormously simplified.

All such matters are far easier at 2,840 yards than at 4,060.

Our ideas as to ranges at which artillery will principally be called upon to fire differ so radically from those of the French that it is difficult to draw any lessons from fire tactics. All that can be said is that, assuming French ideas as to range to be correct, their guns are placed to the best possible advantage, bearing in mind what the characteristics of these guns are.

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7. TRAINING (as exemplified at the Practice Camp).

Before they proceed to the practice camp, French batteries are enabled to carry out some instructional practice on ground of limited extent near their barracks. This is an advantage which we can scarcely hope to obtain.

The great difference between our own and French practice camps is that on the latter there are but few targets and seldom range parties. This, at first sight, must strike us as almost absurd. Let me at once add that as a result, in my opinion, the shooting instruction is inferior to our own.

But how is it that artillerists such as the French can possibly adopt such a system? Is there no compensation? Yes, there is. The tactical training of French batteries on the practice ground is, I think, superior to our own.

Let me here add a caution. Someone who reads this may think that I am severely criticising our practice system. If so, let me remind him that I have myself been in command of the Horse and Field School of Gunnery, and I should be criticising myself more than anyone else.

Everyone who has had to do with practice camps knows how much targets and range parties cramp the tactical action, how false are the positions often created, to what extent the tactical and fire unit commanders have to concentrate their attention on thinking where the staff want them to go, what they want them to do, and what this bit of canvas, that bit of wood is meant to represent, and where the next target will be pulled up.

No one without a most intimate knowledge of the range and its target system can possibly formulate a scheme for practice.

The firing cannot be stopped at will and recommenced again, because target or range procedure is thereby upset.

But on a French practice ground a Divisional General may come down, and with but a brief acquaintance with map and ground may formulate his scheme, and see that his Brigadier General of Artillery directs the action of the divisional artillery in accordance with his wishes.

Tactical and fire unit commanders are at once faced with a new set of problems.

Supposing that a brigade is allotted to support an attack on a certain position, the allotment of tasks, the protection of flanks, the concentration of fire, &c., have all to be arranged for. The fire unit commander has not to think of where the next target will be pulled up, but what naturally, in view of the circumstances, will be the next move of the enemy, and what steps he must take to meet it.

It is perfectly true that fire effect cannot be criticised so well from the battery as from the target end, but it is quite wrong to suppose that no check of any value can be kept over the fire.

It is all a matter of balancing advantages and disadvantages, and so far as my opinion is concerned, I have no doubt that it would be advantageous to divide our practice camp training into three portions.

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1. Instructional practice for young officers or others who have not been reported on as efficient in shooting at previous years' practice.

2. Service target practice under directions of the Brigadier General, R.A.

3. Special practice under the direct supervision of Divisional Generals, during which range parties and targets should be of secondary consideration.

There is only one other point to which I will refer, and that is the excellent training of Reconnoitring Patrols at a French practice camp.

These patrols unite the duties of our Look-out Men and Reconnoitring Patrols.

On the conclusion of our war in South Africa, it was agreed that not enough could be done to encourage the use of Look-out Men and Patrols. Now the former continue a much threatened existence, and the latter seem to be defunct.

8. Conclusion.

The conclusions which I form are as follows:—

1. The French artillery is an example to the artillery of all other countries of how organization, equipment and training can be combined together for one great purpose.

2. There are several matters connected with French equipment and ammunition which are worthy of our close attention.

3. Our ideas as to artillery action differ widely from those of the French; but whether we are correct in our views or not, French systems of ranging and fire are not equally applicable to our equipment; we must develop our systems of ranging and fire in accordance with the characteristics of our gun.

4. We must carefully consider how we can best neutralise advantages possessed under certain circumstances by batteries modelled on, and trained after, the French school.

5. Officers of other arms should realise the difference between their own and French artillery methods.

6. Given our ideas as to range, shooting instruction remains to us of paramount importance, but whilst maintaining this by means of our excellent practice camp target and range party system, we must not lose sight of the advantages to be gained by our artillery being directed occasionally, when firing live ammunition, by the officer who will direct it in war—advantages which are probably reciprocal.

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Notes for Promotion Examinations on the Franco-German War.

By LIEUT. J. C. G. HUNTER, R.G.A.

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(Continued from page 327).

FACTORS WHICH AFFECTED THE COURSE OF THE CAMPAIGN.

Railways.—The employment by each side.

General purposes.

In modern warfare railways are useful for three principal purposes:—

(i.) Concentration of armies in the zone of strategical deployment.
(ii.) For bringing up to armies in the field throughout the campaign stores and supplies of all kinds, reinforcements, &c.
(iii.) For facilitating the evacuation of sick, wounded and prisoners, and occasionally for the movement of troops in the theatre of operations.

Employment by Germans:—

A. To the Rhine.
B. To the north frontier of France.

A. On the German side *nine* railways ran from the interior of Germany to the Rhine, six from north Germany, and three from south Germany. Two debouched at Cologne, one at Coblentz, one at Biebrich, two at Mainz, one at Heidelberg, one at Mannheim and one at Bruchshal.

On these nine railways, in fifteen days, 1200 trains conveyed to the Rhine:—

456,000 officers and men.
135,000 horses.
14,000 guns and waggons.

It was claimed that the transport of these troops was carried out in accordance with time tables carefully prepared beforehand, and there is no doubt that such time tables had been prepared. Hooper says "Whenever a branch or section of railway line was opened for "traffic the entire series of time tables, if need be, were so altered "as to include the new facility for transport." Colonel Maude, however, in his "Evolution of Strategy" states, that the noise and confusion at the entraining stations, caused mainly by an incredible consumption of beer, and the wave of enthusiasm which passed over the country, caused the railway officials at these entraining stations to lose their heads and, after the first forty-eight hours, the carefully arranged time tables broke down and the trains were simply forwarded as they came to hand. "This," he adds, "was never officially "admitted by the German authorities, but it was a fact well known to "all our railway people who have means of finding out these things

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"very soon after the event," and certain passages in Verny Du Vernois' studies of the war seem to confirm these statements, but the fact remains that the German army was brought to the Rhine in the numbers and in the time laid down.

B. From the Rhine to the north frontier of France there are four railways running through the Rhenish provinces, which debouch one at Saarlouis (though incomplete north of Trier), two at Saarbruck, one at Weissenburg. But the movements from the Rhine to the frontier of the Ist and IInd armies was carried out by march route in view of the possibility of an attack by the French army across the northern frontier. These four railways were, therefore, used mainly for the bringing up of supplies and stores, though to some extent also for bringing up troops which had been delayed and were consequently in rear of the main army.

French railways:—

On the other side, the strategical concentration of the French Army was by no means so well served by the French railways.

There were only four main lines leading from the interior to the N.E. frontier, although these, it was true, were fed by many branches.

(i.) North line Mezieres—Thionville.
(ii.) Chalons—Metz line (complete only as far as Verdun, two marches from Metz).
(iii.) Chalons—Nancy and line continued to Strassburg.
(iv.) Colmar—Strassburg line from south.

also a railway roughly parallel to the frontier from Saarbruck—Saargemund—Bitsch—Haguenau—Strassburg.

French use:—

Thus the French had far fewer railways by which to effect their strategical concentration and, moreover, on all these lines the greatest confusion prevailed immediately after the French mobilization was begun. Certainly no time tables had been prepared, and, moreover, the various railways became choked with reservists who, under the French system of mobilization, had, when called to the colours, to find their way from their homes to their depôts, often in distant parts of France, to get their equipment, &c., and then had to find their way back again from their depôts to their units most of which in the meantime had been moved to the N.E. frontier.

INFLUENCE OF THE TOPOGRAPHY OF A COUNTRY ON A CAMPAIGN.

Obstacles:—

In the early part of the war the topographical features of the theatre of war, as a matter of fact, exercised but slight influence on the actual operations of the campaign. But this was because the French made no serious effort to turn them to account.

The two principal topographical features which might have been utilized were:—

(i.) The Vosges.
(ii.) The Moselle.

Both of these offered transverse obstacles to the advance of the German armies. The Vosges to a movement west of the IIIrd Army

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after Weissenburg and Woerth. The Moselle to the advance of all three armies after the strategical wheel to the right had been completed (12th August). In a minor degree also other streams, such as the Lauter, the Sauer, the Saar, the Neid, and the Seille offered transverse obstacles, but owing to the smaller volume of these rivers they could hardly in any case have been regarded as very serious hindrances. They might perhaps have been utilized as rear-guard positions, but they could hardly have been held for a long defence or as pivots of offensive operations. But both the Vosges mountains and the Moselle river were by nature much more formidable obstacles.

Description:—

The Vosges Mountains begin in the vicinity of Belfort where they are separated from the Jura Mountains by the gap of Belfort, and their south portion as far north as Strassburg are some 30 miles wide and densely wooded, and would form a serious obstacle to the movement of troops, being in addition guarded by fortresses. This portion is somewhat outside the theatre of operations in the period under consideration, but probably this obstacle, as well as the Rhine parallel to it, may have influenced the original plan of campaign. North of Strassburg, where they come within our purview, the mountains rapidly decline in height, become narrower, more open, and are traversed by several roads. The passes being not more than about 1200 feet above sea level are, therefore, not more than 700-800 feet above the plains of Alsace.

The principal of these roads are:—

(i.) Strassburg to Saarburg closed by Phalzburg.
(ii.) Haguenau—Upper Saar closed by Petite Pierre.
(iii.) Haguenau by Ingweiler to Saargemund closed by Lichtenberg
(iv.) Haguenau—Saargemund closed by Bitsch.
(v.) Weissenburg—Bitsch.

The fortresses that closed these roads were old and of little value in modern warfare. But the east slopes of the mountains are steeper than the west and offer many good defensive positions against an army advancing from Germany. In the north portion, north of the frontier, the mountains bifurcate, thrusting an irregular mass of uplands deep into the Palatinate, terminating in the isolated mountain height of Donnersburg. North of the frontier, however, the roads traversing the mountains were very few, so that there were few means of inter-communication between troops advancing south to the eastward and westward of them. The only good road across them south of Kaiserslautern was the road by Pirmasenz. Therefore the place became of considerable strategical importance.

How these features might have been turned to account:—

When a topographical feature such as a mountain range or river forms a transverse obstacle to the advance of an army it may be useful to a defender in two ways:—

(i.) By reason of physical difficulties which it offers to the advance of an enemy.
(ii.) Because it may offer good positions to oppose an advance.

But in the campaign of 1870 the French made no attempt whatsoever to turn to account the two strong transverse obstacles which

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they possessed in the Vosges and Moselle, and, therefore, it may be said generally that the topographical features of the theatre of operations only influenced the operations in that they caused the IInd German Army to advance, with some degree of caution towards the frontier, and offered some slight physical difficulties, though in neither case very serious difficulties, to the advance westward of the German armies.

How these two natural and transverse obstacles might have been turned to account is a wide question, but it may be safely said that a really passive defence of them, although for a time it might have been carried out successfully, would not have led to ultimate success. Their true use would have been as pivots for offensive operations, *i. e.*, to enable a comparatively small force to retard the advance of superior numbers while an offensive blow was struck elsewhere.

Strategical employment of German cavalry:—

In the 1866 campaign comparatively little use was made by the Prussians of their cavalry. For strategical reconnaissance the cavalry divisions were generally kept in rear of the armies, the advance guards of the several columns had only a small portion of divisional cavalry allotted to them, and their patrols only moved two to three miles ahead of the columns they were covering. The result was that upon more than one occasion, *e. g.*, when Prince Frederick Charles was approaching the Iser, and just before Konnigratz, the Prussians were without information which could easily have been gained by strategical cavalry, and the possession of which would have been of great value to them. This had been noted by the Prussian leaders, and in 1870 the German cavalry were employed in a very different manner.

General description of the use of the German cavalry:—

Instead of being kept in rear the cavalry divisions in 1870 preceded and covered the advance of the armies. Preceding the main columns by from 20 to 40 miles the cavalry performed the following functions.

(i.) Spread a veil over their movements.
(ii.) Gained on all sides important information.
(iii.) Levied requisitions.
(iv.) Took possession of towns.

Two cavalry divisions were allotted to each of the three German armies,

To Ist Army	1 and 3 Cavalry Divisions.
To IInd Army	5 and 6 Cavalry Divisions.
To IIIrd Army	2 and 4 Cavalry Divisions.

And these before and in the interval between battles were employed for strategical as distinguished from protective duties. The protective work being undertaken by the divisional cavalry.

Action of cavalry:—

(i.) Up to the frontier.
(ii.) Frontier to the Moselle.
(iii.) After crossing the Moselle.

I. *Activity of the cavalry before the frontier was crossed:—*

Even before the frontier was crossed by the main columns, bodies of German cavalry were on French soil, *e. g.*, as the Ist and IInd

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German armies were approaching Saarbruck the German cavalry on the right bank of the Saar had noted at once the retrograde movement of General Frossard (2nd Corps) on the evening of the 5th August. It was of course of importance to ascertain how far, and in what degree, the French were retiring, and consequently parties of German cavalry on the morning of the 6th, immediately after daybreak, crossed the Saar below Saarbruck, rode round the left flank of the French to the direct road to Forbach, observed the French camp, and alarmed both Bazaine at St. Avold, and Ladmirault at Boulay. At the same time, other parties moving round the right flank of the French, crossed the river above Saagemund and tried to destroy the railway and did destroy the telegraph. Not only was valuable information gained by these parties, but their appearance from all sides from the right and from the left filled the French Generals with apprehension, and may have contributed to the debility of their conduct, and to their unwillingness to march to the assistance of the hard pressed 2nd Corps. As another example of the moral effect produced by the activity of the German strategical cavalry, it may be mentioned that soon after the mobilization was ordered a small post of German cavalry was established at Duttweiler, fifteen miles north of Saarbruck; rumours of the presence of German troops at Duttweiler reached the French intelligence department; first it was reported that 40,000 German troops were assembled at Duttweiler, and ultimately information was sent back to Head quarters that 100,000 German troops were concentrated there.

II. Activity of the cavalry from the frontier to Moselle:—

For a short time after Weissenburg touch was lost with the French Army, this was because the 4th cavalry division, which had been ordered to the front by the Crown Prince, found the road blocked by an infantry corps, but starting out on the 5th August at daybreak the German cavalry soon cleared the strategical situation. A brigade of Uhlans rode into the Haguenau Forest; a squadron of Uhlans crossed the Sauer at Gunstett; Schaurott's Hussars found the bridge at Woerth broken and saw large bodies in motion on the heights beyond the stream. Thus a fair presumption was obtained that MacMahon was in position behind the river.

The cavalry of the Ist and IInd Armies after Spicheren:—

In the other quarter of the theatre of operations immediately after Spicheren, the German cavalry pushed many miles ahead of the infantry; some penetrated to the west slopes of the Vosges, some rode to Nancy and the passages over the river below the town, some hung on the rear of the retreating French columns picking up stragglers, capturing prisoners, interrogating officials, and inspecting from commanding points the camps and positions of the enemy. Thus they learnt of the occupation by the French Army of the position behind the Nied even before the occupation was completed. As the French fell back from this position behind the Nied the German cavalry followed the columns, and the other bodies pushed forward to the Seille at Nomeny. On the 12th August one body had entered Nancy and another actually rode into Thionville. Thus the German leaders became informed exactly of the positions taken up by the

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French near the east forts of Metz and also learnt that there was no enemy on the right bank of the Moselle above Metz.

Cavalry on the 13th August:—

On the 13th August the dragoon brigade of the Guard reached Dieulouard and destroyed the direct railway between Chalons and Metz *viâ* Nancy. Two brigades of the 5th cavalry division (Rheinbaben) entered Pont-a-Mousson; one brigade of the 6th cavalry division extended from Courcelles towards Borny, one brigade (6th cavalry division) was at Verny to support the first line, and linked itself with patrols to the brigade. 5th cavalry division at Pont-a-Mousson. The 1st cavalry division crossed the Nied at Pange and occupied the villages right and left. Thus a continuous line of cavalry stretched from the Nied to the Moselle.

III. Cavalry beyond the Moselle:—

The strategical employment of the cavalry beyond the Moselle was confined mainly to the reconnaissance carried out by the 5th cavalry division (on the 15th); an attempt was made at the same time to carry out a similar reconnaissance by the 3rd cavalry division below Metz towards Briey, but the French had removed all boats and they failed to cross. The 5th cavalry division crossed at Pont-a-Mousson on the 14th and were directed to carry out a strategical reconnaissance towards the Metz—Verdun road to ascertain the exact whereabouts of the French army (*vide* German official account); so ably was this movement carried out that the division, after several combats with the French cavalry, was able to bivouac in and round Puxieux and to send back information, which, although not bringing to light the real situation, was nevertheless of great value. At the same time the Prussian Guard cavalry, moving north-west from Dieulouard, placed its advanced brigade at Thiaucourt while a squadron of the Uhlans approached Toul and actually summoned its governor to surrender.

FORTRESSES.

In days when armies were still unwieldy machines, not easily divided and slow of movement, fortresses were largely employed with successful results on the frontiers of every state to close all the roads by which an enemy could advance.

The fortresses closing the passage of the Vosges were survivals of this system. But the increased mobility and flexibility of armies and the increased power of artillery, has rendered such fortresses useless, and none of the small fortresses on the French frontier hindered or impeded, in any appreciable degree, the advance of the German armies or caused any serious diminution of their strength by the necessity of leaving troops behind to mask them.

Their use:—

But larger fortresses, such as Metz, which besides being impregnable to open assault contain within their defences everything necessary for the supply of armies, and where the works include space sufficient for the assembly and security of a large army, may be of great service as *temporary* bases or pivots round which an army can operate with vastly increased power and latitude of manœuvring.

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Their danger:—

The danger would be that a general may come to regard such fortresses not as merely *temporary* bases, but as permanent bases to which he must cling at all costs. This was the mistake made by Bazaine in 1870, his whole conduct after the Germans crossed the Moselle suggests that he was far more afraid of being cut off from Metz than he was of his retreat upon Chalons and Paris being intercepted. The consequence was that the existence of Metz as a fortress not only was of no service to the French army, but exercised a distinctly baneful influence on the operations. Had the fortress not been there:—

(i.) The Emperor's original idea after Spicheren and Woerth of falling back behind the Meuse, by far the safest course to pursue, would have been far more likely to have been carried out.

(ii.) The idea, that there was in Metz a safe asylum into which to retire if driven back, had no doubt something to say to the useless counter-marching to the position behind the Nied.

(iii.) Afterwards no doubt the feeling that the army was safe under the protection of the guns of Metz was responsible in some degree for the delay in the beginning of the attempt to retire from it.

(iv.) Even on the 16th August there was a moment when a vigorous effort to continue the movement westward might have been crowned with success. But at this critical moment Bazaine's dread of losing his hold of the fortress caused him to mass his troops on his left instead of continually extending his right, and again on the 18th it was the same apprehension which caused him to post the Guard at Plappeville.

How Metz might have been turned to account:—

But at the same time it by no means follows that, because in this particular case the fortress of Metz prejudicially affected the operations of the French army; fortresses which are really large entrenched camps are, therefore, of no value in modern warfare. On the contrary, had the French army been commanded by a skilful and energetic leader, and had the army itself been capable of rapid manœuvring, the fortress of Metz would have afforded a most valuable base and pivot for operations to check the advance of the German armies. With Metz as a base of operations, a skilfully directed and mobile force might certainly have hoped to dispute the passages of the Moselle for some considerable time. During these operations opportunities might have occurred for gaining a decisive success, but even had these not presented themselves there should have been no difficulty, after a more or less protracted resistance, during which valuable time would have been gained for organizing the resources of the country, in falling back behind the Meuse on Chalons and Paris.

Moral:—

A fortress may be a valuable aid to a skilful leader with a mobile army, but will not compensate for deficiencies in generals and armies.

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Notes on the War in the Peninsula, 1808-10.

Including the "Giron" diaries. Edited by Major J. Arzadun, Spanish Artillery.

By MAJOR GENERAL J. C. DALTON, R.A. (retd.).

(With Map).

(Contined from page 360).

PART VI.

Bilingual conference.—Anxiety of Cuesta.—Ambitious subordinates and inexpert soldiers.—Emulation of the veteran.—His indomitable rectitude.—Loyal co-operation of Venegas.—An unedited letter.

For the first time the British and Spanish nations were to join forces.

The two chiefs not only commanded heterogeneous armies, but were incompatible owing to feelings of independence, mutual hostility and badly concealed distrust.

Wellesley, aware of his military talents, not as yet revealed to the Spaniards, openly aspired to the supreme command. Cuesta at the head of an army, superior in numbers, indignantly rebelled against the idea of serving under (as he imagined) a beginner. They could not understand each another; the Spaniard refused to speak in French, and O'Donoju, Chief of the Staff to Cuesta, had to serve as interpreter at the none too cordial conferences which were held.

Those who blame the veteran Cuesta for the consequences of strange mistakes, and who accuse him of want of intelligence because he was unable to solve impossible problems, should pause a moment and consider the difficulties and surprises which harassed him, more oppressive even to his vigorous spirit than the physical exhaustion due to his recent wounds and increasing age.

He knew that the liberals of the Central Junta, who had for some time past been warned against him, wished to replace him by the Duke of Alburquerque who was far too enthusiastic and hot tempered to submit to the restraints of a subordinate command. Venegas, who was outwardly subject to Cuesta's orders, but in reality received instructions direct from the Junta, did not inspire him with confidence.

With newly raised armies one of the flaws caused by imperfect

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discipline is the want of firmness and cohesion amongst the soldiers, and perpetual bickerings amongst the generals, the effect of which is all the more disastrous in proportion to their loyalty, intelligence, and enthusiasm, and to their anxiety to do the right thing. The want of those habits of obedience and of that absolute confidence which impels veterans to comply in blind faith, with orders which may seem at the time inexplicable, leads a younger and less experienced man to sterilize with pernicious modifications the most carefully thought out plans, and, often, by a suddenly extemporized initiative to so alter the intention of combined operations, that these become disconnected and fail utterly.

The most powerful war horses will fail to urge forward the car of victory unless their impetuosity be restrained, and they be brought to obey docilely the rein and voice of the charioteer. They will then put forth their united strength as one.

Cuesta was worried by the want of firmness of his recruits, the majority of whom, badly armed and worse clothed, just torn from the plough by an imperious conscription, were soldiers only in name. The noble veteran had the unhappiness to find himself constrained, in the waning light of his military career, and at a time when the forces of nature were getting too much for him, to have to lead to battle mobs without cohesion; masses of sand on which no plan could be cemented without its crumbling away, and on which he could found no hopes that would not be frustrated and wrecked.

History is loaded with a burden of disdainful commentaries by clear sighted historians, writing at their study tables, on the dispositions which the brave Cuesta, who under threats of death was forced at Valladolid to march at the head of his mutinous troops against the French, adopted at Cabezon. Could there be anything more crazy than to force his undisciplined troops to fight with a river in their rear? If anyone could have sounded the mind of the audacious old warrior, he would have discovered without doubt that Cuesta, foreseeing the probable stampede of his noisy insurgents without waiting to fight, deemed it advisable to close the road to flight by presenting in their rear an obstacle they could not pass so that desperation might gain that which want of discipline would otherwise frustrate.

Blake adopted, later on, the same tactics at Alcañiz with the Guadalupe in his rear, and only one bridge on his line of retreat, so that his troops had to choose between disaster, or victory.

Did not the Spanish generals come of the race of Hernan Cortez, and were they not admirers of him who, by burning his boats, taught the world how to bar the way to panic and retreat?

Obstacles failed to daunt the indomitable spirit of Cuesta; for which reason he is, and ever will be, the idol of the people, who love those who display energy and action. Even the Junta congratulated and rewarded the leader defeated at Medellin, ordering him "to see and get his wound carefully treated, because he was the firm support of his country." Defeat did not intimidate him, but he dreaded lest the prestige of the Spanish arms should be diminished through co-operating with the allies; and lest the next battle should prove the

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inferiority of the Spanish army, and the victory over the French be only an English success.

To this feeling of noble emulation is to be attributed the origin of his inexplicable acts; he would not attack Victor at the proper moment in order that he should not appear the subordinate of Wellesley. When the latter refused to cross the Alberche, Cuesta advanced alone, the madness of which act was still further aggravated by the opportune reinforcements of Sebastiani's division and King Joseph's reserve, and he had to yield before superior forces, wasting a long time in a chivalrous parade in order not to let it be thought that his retreat was a flight. He took the shelter of the river and resisted the exhortations of the British leader with a calm audacity which even now, after a century of implacable censure, we cannot help admiring.

The balance of forces was such that neither general was sufficiently strong by himself to attack the enemy.

20,000 English added to the 36,000 recruits of Cuesta, could have easily accounted for the 22,000 soldiers of Marsnal Victor, notwithstanding the reinforcement of 12,000 from the central reserve of King Joseph.

To prevent Sebastiani supporting from La Mancha with the 20,000 men he had in Madridejos, Cuesta had (as we have seen) ordered Venegas to advance with his force, 23,000 strong, to threaten Madrid. Was the weakness of his attack premeditated as is stated, or did perchance his retirement without fighting induce the enemy to undervalue the attack instead of allowing it to produce in them the great alarm which it rightly ought?

In order that we may be convinced of the perfect loyalty of Venegas, let us examine Giron's diary, which makes it clear that they had before them in dangerous proximity the entire army of Sebastiani.

The 3rd division of which Grimarest had on July 9th handed over the command to Giron, now convalescent (who held it until the army was destroyed), was the largest in point of numbers; it was composed of the first battalion of the Spanish Guards, the second Cordova battalion, the regiments of Bailen and Alpujarras, the provincial infantry of Jaen and Ecija, with the battalion of Velez Malaga as light infantry; the cavalry consisted of the regiments of Farnesio, Alcantara, and Santiago, and the Queen's Dragoons (de la Reina). In all there were 6232 infantry and 1083 cavalry with a field battery of six guns and a company of Sappers, commanded by Hermosa and La Iglesia respectively.

The discipline of the division left much to be desired.—Giron wrote on July 10th:—

> "Soldiers of this division behaved badly in the town of Valdepeñas where "we were, by breaking open doors and stealing wine. Some 40 of them were "apprehended, ten per cent. of whom I ordered to receive on the following "morning 100 lashes each in the public plaza in the presence of a picquet "from each Corps. The remainder I handed over to their respective units to "be punished at the discretion of their commanding officers.

On the 11th he dictated an order "to stop the abuse of women following the division."

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On July 14th arrived the order to march on Manzanares, and at 9 p.m. the division moved off in good order.

"The order of march was: Vanguard composed of the Queen's dragoons and "those from Velez Malaga under Sanz; then all the cavalry under Brigadier "Mendoza with the two horse artillery guns; the company of sappers; the "foot artillery; the infantry; the divisional ambulances."

At noon he received a message from Venegas ordering him to retire if the report of the entry of 4000 of the enemy into Villa Rubia were confirmed.

"I had to make the march in a chair because I was too weak to mount a "horse except as a last resort."

At 5.30 he arrived at Manzanares.

"I formed up in the open, on the road to Madrid; one battalion garrisoned "the citadel which had been splendidly fortified by the enemy, but only for "musketry fire. In it was a tambour formed by a pointed stockade similar to "those proposed by St. Paul for caponiers. The town had been well knocked "about by the enemy, but was not to be compared in this regard to Valdepeñas. "At night I received the general order to summon the commanders of the 1st "and 2nd divisions to a conference at 9 a.m., at which His Excellency was to "assist with the commanding officers of artillery and engineers."

The vacillations of Venegas are shewn up in this Council of War. He adduced arguments in support of the weakness of his command.

On July 20th the guerrillas engaged the French "without any result worth mentioning" at the bridge of Villalba which had been cut by the enemy.

"It is known that Sebastiani, who had retired to Madrid, had returned to "take up the command of the army; that the enemy had received from Toledo "a reinforcement of about 3000 men, and that they have concentrated their "position at Consuegra, Urda, Madridejos and Villafranca, with some cavalry "at Puerto Lapice."

"July 21; six hundred of the enemy have appeared at Villa Rubia de los Ojos. "I had news that 3000 Germans are located between Consuegra and Madridejos."

This was the detaining force which Sebastiani, already aware of the prudent passiveness of Venegas, had left behind when he went to the assistance of Victor, "in order to keep our very unenterprising divisions well occupied by means of threatened attacks and manœuvring."

"22nd. Nothing fresh; thirteen Germans passed through Daimiel. They said "that in their army there was much uneasiness; that news had arrived of a "French defeat in Germany, and that the Emperor had been wounded . . . . ."

The timidity of the attacks by the enemy was noticeable, and it was evident that their orders were to occupy the Spaniards, but not to fight.

"23rd. My irregulars (guerillas) fought for four hours on the bridge of "Herencia. They frequently repulsed a hundred of the enemy's cavalry and "passed the river twice; we had two horses wounded . . . . ."

At last, on July 25th, Venegas heard of the march of Sebastiani to the assistance of Victor, and ordering an advance to Madridejos "without unduly compromising yourselves." A letter of his dated from Herencia on the 26th leaves no doubt as to the accuracy of his information:—

"Friend Giron; One single division of the enemy has left for Ocaña, and the "remainder gone towards Toledo, doubtless to effect a junction with Victor. I "have taken steps to repair the bridges, and in order to facilitate this operation "have sent a Lieutenant Colonel of Engineers, with full powers to the magis-

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"trates of Ocaña, Aranjuez and others. As to the favourable news you give of "Cuesta, I am entirely ignorant, and, owing to the lack of intelligence which "I am experiencing, I have been obliged to despatch to him a staff officer, "Cebrian, to see whether we can combine during this critical epoch."

No, Venegas was not intentionally remiss; later on we shall prove fully his sincere desire to do the right thing, though he was vexed at the state of absolute neglect in which his Chief left him as regarded orders and intelligence, because Cuesta would not submit to limit his action to suit the frigid and enigmatical Wellesley.

The younger general was neither deficient in resolution, nor was he necessarily inactive. There is no doubt that the news of his appearance before Toledo, received on the battlefield, induced King Joseph, terrified at the danger to his tottering throne, to resign himself to the premature and disastrous attack demanded by Victor. And, a familiar letter reveals to us the plaintive grievance of the general, kept under by orders from afar, when he sees the fleeting opportunity for capturing Madrid (denuded of its garrison) elude his grasp, whilst he is champing his bit impatiently between murmurs and threats.

PART VII.

Advance decided on.—Neither orders nor news.—Giron in Aranjuez. —Lacy before Toledo.—The victory of Talavera.—Harangue by Giron and Vigodet.—Consequences of the battle.—The obsession of Venegas.

Once Venegas knew of the daring movement of Sebastiani, who left the road to Madrid defenceless and open to him, there was nothing easier than to gain the capital by a brisk attack, dispersing the 3000 Germans who stood in his way; but he was held back by the absence of orders authorizing him to attempt the bold venture.

The state of his mind, in which combativeness and anxiety alternated, is indicated by the three following official letters addressed by him in the same day (the eve of Talavera) to Giron.

"Tomorrow at dawn you will proceed with your division (the third) to "Consuegra, noting that at the same hour the first division will be in Turleque, "the second in Camuñas, the fourth and fifth in Madridejos, whether I shall "also proceed at the same time. Dated from Head Quarters in Herencia, 26th "July, 1809, at 3 p.m."

Another written the same day at 7 p.m., says:—

"I have received your two letters of 3 p.m. and 4 p.m. to-day brought by "D. Benito Penilla from the Junta of Ocaña. From them and from what "Penilla tells me, I am blamed for the movement of the enemy and for the "burning of the bridges over the Tagus. I therefore am taking the following "measures . . . . ."

And the letter written at 10.30 p.m. reveals his natural state of uncertainty:—

"I must hope that further news may enlighten me as to the line I ought to "decide on, not feeling certain whether it is to be Madrid or not. However, "please warn Lieut.-Colonel Rigloe to advance tomorrow to Ocaña, taking all "suitable precautions, warning him that he may fall in with in Ocaña, or hard "by, the small flying column of D. Felipe de la Corte, who is charged with "the protection of the parties engaged in repairing the burnt bridges."

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Another letter dated in Ocaña the 29th at 6 p.m., details the movements of the army which was engaged continuously in endeavouring to get into touch with the enemy, but he was still undecided as to marching on Madrid:—

"According to your letter of 1 p.m. to-day, I note your arrival at that royal "borough (Aranjuez) with the division under your command at 8 a.m. without "anything special to report, and that Brigadier Bigodet[1] (commanding the "2nd Division) had taken all suitable precautions. He informs me that "Colonel D. Felipe de la Corte was to reconnoitre the long bridge, the result "of which I beg you to communicate to me. Brigadier Lacy (commanding the "first division) tells me in a letter dated 10 p.m. the day previous, that he had "arrived at Toledo, and that our artillery had replied with considerable effect "to the enemy's fire, directed against our division with two "pieces of four"; "that at the same time he had given some rest to his troops, and purposed to "continue his attack against the St. Martin's Gate at daybreak to-day. Doubt- "less this is the firing which was heard to-day from Ocaña.

"I know nothing of Captain General D. Gregorio de la Cuesta, and I am "awaiting the arrival of his despatches in order to continue our operations. "Meantime it would be as well for you to comply with my verbal instructions, "and endeavour to harass the enemy as much as possible and verify his "positions, as well as those of our allied English and Spanish army."

The advance was completely paralyzed, and the action of the troops was limited to prudent reconnaissances.

Venegas gives further orders on the 30th July at 9.30 a.m.:—

"You will arrange that Brigadier D. Pedro Josef Gámez, with 400 cavalry, "shall reconnoitre the position of the enemy and alarm him. This can be "done by his moving towards Olías with all due precautions such as I expect "from so capable a leader. Colonel D. Felipe de la Corte with his small flying "column will place himself under the orders of Gámez for this expedition."

Very soon after Venegas received the news of the triumph at Talavera.

"I enclose a copy of the official letter which I have this moment received "(noon) from His Excellency the Captain General, D. Gregorio de la Cuesta, in "which he informs me of the defeat of the enemy, in order that you may not "have to wait for such satisfactory news, and that you may spread the intelli- "gence through the division."

"P.S.—This auspicious event will be celebrated by a general salute of artil- "lery."

Even louder than the cannon, resounded the sonorous harangues of Vigodet and Giron. We have before us the rough draft in the handwriting of Giron, freely amended by erasures and interpolations, to round the periods and enhance the general effect.

"Soldiers of the second and third divisions of the Army of Andalusia:—

"The enemy's army, commanded by Joséph Bonaparte in person, has been "completely defeated on the field of Talavera on the 27th and 28th of this "month by the armies of Captain General D. Gregorio de la Cuesta and that "of the English, under General Wellesley. This victory is decisive and should "have the effect of soon rescuing our dear country from those who have by "such horrible means striven to subdue her.

"If on this occasion, so glorious for our country, there could linger amongst "us any feeling of regret, it would be because we have not participated in the "dangers and laurels of the victory; but fortune is sure to allot to us an "opportunity for manifesting our patriotism before we finally succeed in "wresting our land from these iniquitous oppressors; so console yourselves "with this noble thought.

"Soldiers: You may from this moment fight the French in any way you like; "they cease to be redoubtable so soon as they have known defeat.

"The country will very soon be free and you will all be regarded in Europe "as so many heroes.

"Soldiers: Long live the Spanish nation and our adored Sovereign, Ferdinand "VII.

(signed). Gaspar Vigodet. C. P. A. Giron."

[1] Same as Vigodet.—*J.C.D.*

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What pleasing hopes and promises! But, alas! How vain and ephemeral!

The Spanish arms gained precious laurels in that victory so dearly bought; a glorious page in the festivals of the Spanish cavalry, who are justly proud of the brilliant and successful charge effected by the King's regiment (del Rey), which drew forth an exclamation of approval from the unimpressionable Wellesley; also the valuable help which Piñeiros' and Entrenas' batteries afforded to the small force of British artillery,[1] who used the recently invented shrapnel shell; and the firmness displayed on the 28th by the Spanish line which was less engaged than was the English. The Spanish recruits could not be called on to make a daring attack against such a highly trained enemy, and across olive groves and ravines any more than were the English in a position to reap the fruits of victory by a vigorous pursuit.

The want of supplies, the threatened advance of Soult who was moving on Plascencia, and the news of the armistice in consequence of the battle of Wagram which enabled the victorious Emperor to redouble his attacks in the Peninsula, all combined to induce Wellesley to turn to the security offered by Portugal.

The efforts of the Central Junta to revert to the original plan of freeing Madrid were vain. On Venegas, who was deeply committed to this unfortunate enterprise was to fall the wrath of the French, who were by no means broken up or cast down.

It was evident that he could, and ought to, renew his judicious retirement of the previous month, gaining time under the shelter of the Sierra; but he was unable to do it because Cuesta was bent on suppressing his warlike ardour, by announcing to him the dark cloud which was approaching and was about to envelop him.

He had inhaled the smoke of the battle and tasted the doubtful savour of distant victory; he had figured to himself his entrance into Madrid, deadly, but glorious for him who should embark on the venture; he had waited with impatient anxiety the word of command for the final advance, and instead of all this he received timorsome counsels and prudent monitions.

His peevishness on receiving these is shown by the following unpublished letter, addressed to Giron from Ocaña on August 3rd, 1809:—

"Esteemed friend: The strawberries came when we were at the last course "and were greedily devoured by the diners.

* * * * * * *

"We have lost the opportunity of entering Madrid without opposition, and "it is our unhappy fate to operate without freedom, and subject to orders. I "feel almost obliged to let it be known, because since the announcement in "the Gazette that I had the desire to move on Madrid, the public might "accuse me of inaction. Cuesta has given me strict orders not to advance, "giving as his reason that he is obliged to give his troops rest and food, and "that they could not, therefore, follow on, and that the 26 to 28,000 men still "remaining to Marshal Victor would fall on us."

[1] There were only three[2] batteries of British artillery—six pounders and three pounders, and two of the German Legion. The Spaniards had thirty guns, of heavier calibre generally than the British, and including two twelve pounders. Their guns were well served and were of material assistance.—*J.C.D.*

[2] The three batteries are now the 2nd, 18th and 87th Field.—*A.J.H.*

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"I enclose a copy of the official letter which I have this moment received "(noon) from His Excellency the Captain General, D. Gregorio de la Cuesta, in "which he informs me of the defeat of the enemy, in order that you may not "have to wait for such satisfactory news, and that you may spread the intelli- "gence through the division."

"P.S.—This auspicious event will be celebrated by a general salute of artil- "lery."

Even louder than the cannon, resounded the sonorous harangues of Vigodet and Giron. We have before us the rough draft in the handwriting of Giron, freely amended by erasures and interpolations, to round the periods and enhance the general effect.

"Soldiers of the second and third divisions of the Army of Andalusia:—

"The enemy's army, commanded by Joseph Bonaparte in person, has been "completely defeated on the field of Talavera on the 27th and 28th of this "month by the armies of Captain General D. Gregorio de la Cuesta and that "of the English, under General Wellesley. This victory is decisive and should "have the effect of soon rescuing our dear country from those who have by "such horrible means striven to subdue her.

"If on this occasion, so glorious for our country, there could linger amongst "us any feeling of regret, it would be because we have not participated in the "dangers and laurels of the victory; but fortune is sure to allot to us an "opportunity for manifesting our patriotism before we finally succeed in "wresting our land from these iniquitous oppressors; so console yourselves "with this noble thought.

"Soldiers: You may from this moment fight the French in any way you like; "they cease to be redoubtable so soon as they have known defeat.

"The country will very soon be free and you will all be regarded in Europe "as so many heroes.

"Soldiers: Long live the Spanish nation and our adored Sovereign, Ferdinand "VII.

(signed). Gaspar Vigodet. C. P. A. Giron."

[1] Same as Vigodet.—*J.C.D.*

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What pleasing hopes and promises! But, alas! How vain and ephemeral!

The Spanish arms gained precious laurels in that victory so dearly bought; a glorious page in the festivals of the Spanish cavalry, who are justly proud of the brilliant and successful charge effected by the King's regiment (del Rey), which drew forth an exclamation of approval from the unimpressionable Wellesley; also the valuable help which Piñeiros' and Entrenas' batteries afforded to the small force of British artillery,[1] who used the recently invented shrapnel shell; and the firmness displayed on the 28th by the Spanish line which was less engaged than was the English. The Spanish recruits could not be called on to make a daring attack against such a highly trained enemy, and across olive groves and ravines any more than were the English in a position to reap the fruits of victory by a vigorous pursuit.

The want of supplies, the threatened advance of Soult who was moving on Plascencia, and the news of the armistice in consequence of the battle of Wagram which enabled the victorious Emperor to redouble his attacks in the Peninsula, all combined to induce Wellesley to turn to the security offered by Portugal.

The efforts of the Central Junta to revert to the original plan of freeing Madrid were vain. On Venegas, who was deeply committed to this unfortunate enterprise was to fall the wrath of the French, who were by no means broken up or cast down.

It was evident that he could, and ought to, renew his judicious retirement of the previous month, gaining time under the shelter of the Sierra; but he was unable to do it because Cuesta was bent on suppressing his warlike ardour, by announcing to him the dark cloud which was approaching and was about to envelop him.

He had inhaled the smoke of the battle and tasted the doubtful savour of distant victory; he had figured to himself his entrance into Madrid, deadly, but glorious for him who should embark on the venture; he had waited with impatient anxiety the word of command for the final advance, and instead of all this he received timorsome counsels and prudent monitions.

His peevishness on receiving these is shown by the following unpublished letter, addressed to Giron from Ocaña on August 3rd, 1809:—

"Esteemed friend: The strawberries came when we were at the last course "and were greedily devoured by the diners.

* * * * * * *

"We have lost the opportunity of entering Madrid without opposition, and "it is our unhappy fate to operate without freedom, and subject to orders. I "feel almost obliged to let it be known, because since the announcement in "the Gazette that I had the desire to move on Madrid, the public might "accuse me of inaction. Cuesta has given me strict orders not to advance, "giving as his reason that he is obliged to give his troops rest and food, and "that they could not, therefore, follow on, and that the 26 to 28,000 men still "remaining to Marshal Victor would fall on us."

[1] There were only three[2] batteries of British artillery—six pounders and three pounders, and two of the German Legion. The Spaniards had thirty guns, of heavier calibre generally than the British, and including two twelve pounders. Their guns were well served and were of material assistance.—*J.C.D.*

[2] The three batteries are now the 2nd, 18th and 87th Field.—*A.J.H.*

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Venegas was suffering from the most dangerous obsession which could serve to blind a general—the fear of appearing ridiculous in the eyes of public opinion. The orders of the rash Cuesta enjoining prudence seemed to him absurd, and dictated by distrust as much as by jealousy.

Did they wish him to retreat without a fight? Were others to have the fighting and success whilst he was to beat a timid retreat after his intended and imaginary attack had been exaggerated, and the people had been excited in the hopes of once again seeing their capital freed from the presence of the enemy? Once more, was he to have to endure pitying congratulations and cruel jokes . . . . . Marques de la Romeria! . . . . . El General Retiradas!

On his brow the furrows of rebellion were being ploughed deeper and deeper, and his decision was being formed to charge blindly and without any plan, happen what may, anywhere, and the sooner the better. He is no longer the cautious general watching serenely for the favourable moment, measuring and weighing the chances of victory; he is the soldier who, being blamed for cowardice rushes in search of death as the sole remedy for his ignominy. In graphic and popular language General Venegas "saw red" and deliberately extinguished himself.

PART VIII.

The action of Aranjuez.—Four official letters in one afternoon.—The triumph.—Killed, wounded, and distinguished.—Impressions of a general of the day.—Song of victory.

Historians are not quite accurate in saying that Venegas accidentally missed taking part in the combat at Aranjuez from having left on August 5th for the purpose of reviewing other forces.[1] All his official letters—amongst them four on that very day—are dated from head quarters at Ocaña, and in none of them is there any mention of even the most insignificant visit to the Royal borough. Therefore any glory which may result from the careful dispositions adopted for the defence of a river, which was easily fordable at that time, belongs entirely to D. Pedro Augustin Giron.

Nevertheless, does that successful affair deserve all the honours of victory? Are the disdainful silence of Thiers (who suppresses all mention of the combat), and the bare acknowledgement granted it by Spanish writers, just? The historian may, perhaps, decline to take up his time with a matter of so little importance; but he also analyzes states of mind and phases of opinion; he who labours to discover how these luckless heroes thought and felt, forced to seek in illusion a comforting refuge against panic, will find when examin-

[1] Oman states (Vol. II., p. 612) that Venegas "chanced to be absent at the "moment as he had ridden over that morning to visit his left wing, and General "Giron was in temporary command of the defence." Sebastiani attacked the position, but failed, and withdrew.

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ing the qualities of the corps commanders whom the editor has in view, a curious study of character and military customs.

The absolutely good faith of Giron, and the entire absence from his nature of any preconceived idea of exaggeration, are made evident in the first lines of the letter from Venegas, dated 5th August, 1 p.m.:—

"I received your letter of 12.15 p.m., from which I gather that there may be "a reconnaissance on account of the small numbers (of the enemy) who have "been descried."

Another despatch, signed at 5.30 p.m., from Venegas, reveals an increasing uneasiness, which imparts to his writing the character of an order to retire:—

"I have received successively yours of 2 p.m. and 3.5 p.m., and at this moment "another letter has come by the hand of D. Juan de Molina; when thoroughly "informed, you will arrange that Brigadier Lacy with his division and all "troops belonging to him who may be thrown forward, shall enter Aranjuez, "re-crossing by the Puente de la Reina, which should be destroyed. This done, "should the enemy attack you will strongly cover the passage of the river by "the first division, and you with the second and third divisions will at nightfall "occupy a first position along the chain of hills which divide Mount Parnassus. "If the vanguard is driven in, it will fall back on you."

That dated 7 p.m., though confidential, is an order to march:—

"When you receive this, if circumstances should permit (for if you should "be engaged with the enemy it might be ruinous), you will march, with the "divisions, as follows:—

"The second and third divisions together will arrive at dawn at La Guardia, "and will leave to the first division, which is to cover the rear-guard, the "regiments of Farnesio, Lusitania, and España. The said first division, thus "reinforced, will continue its march, covering the rearguard, and will watch "the country between Dos Barros and La Guardia, where it should be at 8 a.m. "The fourth division will move out at daybreak to Tembleque."

In the official letter of 10 p.m., all were overjoyed at the result of the combat of Aranjuez; Venegas did not adjudge it to be a definite success, inasmuch as he promises his troops fresh opportunity for success, and with that object in view he persisted in his orders for the march, though he somewhat modified them.

"I am highly satisfied at the brilliant manner in which your divisions have "resisted the enemy. Convey to them my goodwill and indebtedness. I can do "nothing better for them, than when praising their conduct and recommending "it to His Majesty, to afford them another opportunity, when under more "advantageous conditions, they may defeat the enemy, and increase their own "glory. To this end you will march at once with the 3rd division to La "Guardia; the second will follow you, and will remain in Ocaña till further "orders, and Brigadier D. Luis Lacy will remain in Aranjuez with his division "and with the reinforcement of cavalry which I have already ordered."

In accordance with these orders the third division left for La Guardia at 5.30 a.m. on August 6th, 1809, where it arrived at 1 p.m., "the troops having marched very well, notwithstanding their fatigue."

On the following day all the corps commanders announced the losses they had sustained in the fight.

Certainly there was not much bloodshed; one has no occasion to employ, when quoting the losses, the astounding figures which served to intensify the glory of the victor. Several units reported that they had not suffered any losses.

In the return of the dragoon regiment of Granada, commanded by D. Diega Ballesteros, who was wounded and taken prisoner a few days later at Almonacid, we read:—

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"This regiment had one dragoon and two horses killed, and I have not heard "that anyone in my regiment distinguished himself or had any opportunity of "doing so."

"On the other hand, the Ronda regiment, which had seven wounded, boasted "that according to statements of several members of the Ecija regiment, the "heavy fire maintained by the Ronda regiment forced the enemy to abandon a "gun which was concealed and was causing that regiment great havock."

Its commanding officer, the future General Virués, mentioned as distinguished all the field officers and adjutants, with one sergeant-major and "especially" (in capitals and underlined) "the distinguished volunteer soldier, the Count of Casa-Roxas."

It would take a long time (but would be curious) to transcribe the various narratives of that day, from that which refers to it in four words followed by a list of losses, somewhat considerable, up to that which fills a sheet of closely written paper, with the drawn out narratives of the merits of a single company, adding the name of the only man wounded, and that of a soldier who had a bullet through his head-gear . . . . !

The total casualties of the third division was two officers killed (one of the Velez-Malaga regiment, and one of the artillery, who had one gun dismounted by the enemy's fire at pistol range), three officers wounded and one contused; 15 soldiers killed, 71 wounded and 7 contused. Of the second division, we have only seen the report giving the number of casualties and the names of those who distinguished themselves; in it General Vigodet recommends his aides-de-camp, and mentions by name two field officers of Engineers under his immediate orders, and one captain of the same corps, "stationed in the tower of the Convent to observe the enemy's movements." We quote this fact, as a further proof that the engineers of that period supplied with considerable distinction the want of a Staff Corps which did not then exist.

However, supposing the total list of casualties of the three divisions to have amounted to 200 as indicated by the illustrious General Arteche, it is not easy to understand the enthusiasm caused by a day's work such as that we are considering.

Compared with the normal standard, the action of Aranjuez is well described by an English writer as a " sharp skirmish."[1]

Who is to blame for so great a divergence of opinions, except those who base their judgment on meaningless figures?

Imagine to yourself the timorous anxiety of the unfortunate general at the first appearance of the enemy. Will the battalions face the attack? In what quarter will the first cry of panic break out, which must be at once stifled in blood so that it shall not penetrate to the others and spread like a train of powder?

Already from the tower they are signalling the arrival of large forces; the dark cloud of the infantry; in front of them are to be seen the squadrons of horse extending and reconnoitring our positions; the artillery will shortly bellow forth its thunder. Will the battalions stand firm?

The enemy's troops are legion; on which point will they direct their attack?

A despatch arrives from the general commanding which orders

[1] Oman. Vol. II., p. 612.

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a retreat. . . . . What a haven for the timorous! What ignominy when, having once crossed weapons, they have to lay them down without honour!

The interminable hours go by, and still the river, festooned with smoke, separates the combatants; the enemy's rushes grow stronger with intervals, then they grow weaker; tempestuous volleys are followed by irregular lulls. . . . . A very long lull takes place, then, suddenly the captain who overlooks the field from his tower, bursts out with a joyful exclamation:—

They waver! They retire! The victory is ours!

What enthusiasm! What joy!

What matters it if the attack were not as obstinate and vigorous as usual? If the enemy did not push the attack the discredit is his, and he alone could measure the amount of effort he should put forth. If he yielded without fully exerting himself, he was evidently impressed by the firmness of our troops. . . . he has, anyhow, to return crestfallen and gloomily over his lines of retreat.

And, as a pœan of victory, intended to sweeten, at last(!) the bitterness of so many defeats, Giron, from La Guardia, harangues his victorious troops:—

"Soldiers of the third division of the Army of Andalusia,
"I wish to thank you for your brilliant conduct in the action of yesterday "afternoon. The enemy who has not hitherto had proof of your valour during "this campaign, has now learnt to know you. Fate adapted you for covering "the points which required the greatest firmness, and the enemy found in you "a wall which he could not overcome . . . . . Thrice he repeated with fury "his attacks during the five hours' fight, and thrice he had to retire confounded. "There was not a man who did not do his duty and who did not enter into the "fight with joy."

One can picture the scene. The battalions overcome with the fatigues of the day, listen, as night falls on the field of La Guardia, formed up and in silence, to the sonorous harangue; whilst in their front, in the steamy dim light of the summer evening, the intense Castilian sky was beginning gradually to reveal its stars. These youths, ragged and smoke stained, amazed to be able to style themselves conquerors, drink in with avidity these virile eulogiums which warm up their blood with eagerness to merit them. They are not mere niggardly adulation; a genuine warmth fires the rounded periods:—

"To your heroic constancy and to the glorious enthusiasm of your leaders "and officers, the victory is due . . . . . "

The Andalusian blood in Giron's veins was surging, warm and generous, in that harangue which, across the cold of a century, may appear exaggerated and out of proportion.

Ah! if our ancestors had been like our cold reasoners of to-day, where would have been that ardent faith which led them to resist to the last, and despite every obstacle, with a determination as reckless as it was sublime.

"Let us fly to fresh combats, with the certainty of gaining new victories."

How would the youthful mind of the poor recruits receive this glowing excitement? They would imbibe in these intoxicating phrases, the divine illusion which was to be then and always their firmest support in time of disaster.

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He is to be blessed who scatters on the brows of his soldiers the flowers of his eloquence. Thanks to him, they will know for whom they suffer and die, and, marching bravely to sacrifice on the altar of their country, they will face death smiling, as did the rose-crowned victims of the cruel gods, on entering the sanguinary arena.

PART IX.

Spirit of the troops.—Resolve of Venegas.—Council of War.—From attack to defence.—Almonacid.—Exiguous reserves.—Giron's casualty list.—The towns of La Mancha.

The brave men who had been successful at Aranjuez were not well pleased at receiving Venegas' order,[1] which by removing them from the scene of their exploit, seemed to them the beginning of a retreat.

In a written paper, unfortunately incomplete, headed "My opinion on the battle of Almonacid" which was found amongst Giron's papers, there occur these words:—

"The troops who had conquered in Aranjuez accepted with very bad grace "a retrograde movement, so much at variance with the advantages they had "just obtained over the enemy, and with the necessity for taking every advan- "tage of the enthusiasm and feelings of superiority which the troops were "then experiencing."

As we have already seen, Venegas was not the only one whom the desire for fighting blinded; the spirit of the troops was also opposed to the retirement which would have saved them. Nevertheless it is only a very suspicious person who could see in the change of front which Venegas executed, the commencement of a retrograde movement; he did not abandon Aranjuez where he had left the first division, the second being in Ocaña, the third in La Guardia, the fourth in Tembleque and the fifth directed on Toledo.

It is evident that far from thinking of retiring, Venegas foresaw that Sebastiani would pass the Tagus at Toledo, and he disposed his forces with the characteristic rashness to which we have before referred, to attack him without delay. It is only fair to admit in his defence that he was ignorant of the true strength of his opponents.

The enemy's strength was 21,000 including 4000 cavalry, whom it was audacious to disregard when only two leagues from Toledo, which place offered to the enemy a support in his advance, and a refuge in case of defeat; in the same way as his bridges permitted him to accept battle or postpone it, and to force the Spanish general to limit his plans to suit his opponent.

The following order of march dictated by Venegas to Giron at 7.45 a.m. on August 9th, 1809, reflects a most decided resolve:—

"At 3 p.m. to-day you will march with your division to Almonacid, procuring "guides who will direct you by the best and shortest road suitable for artillery. "There you will find the fourth and fifth divisions, or some of them, and (as "I have already warned Generals Zerain and Castejon) you will in conjunction "with them oppose such of the enemy as may have left Toledo, on account of "having been reinforced. I go tomorrow to the village of Almonacid."

[1] See Part VIII. The 3rd division to march at once to La Guardia (dated August 5th, 1809, 10 p.m.).

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At that very hour the French were, with very superior forces attacking Zerain's division which:—

"had to retire in full view, and under the fire of, the enemy, doing so in a "manner entirely to their credit."

Giron writes:—

"We arrived at Almonacid and met the fourth and fifth divisions in position "at some distance from the town; the Commander-in-Chief came from Villa-"nueva de Bogas with the third division which he commanded, and, on my "arrival when I asked where the troops were to be placed, an engineer officer "informed me that two battalions were required to complete the defence of the "position, and the general had ordered me to supply them from my division. "I accordingly selected the Bailen and Jaen battalions, which were those that "had had fewer opportunities than the others in the fight at Aranjuez. The "rest of the division remained in battalion columns on the right of the town; "the artillery apart, and the cavalry in rear of the right.

"The second and first divisions arrived on the evening of the 10th, the "former was placed in column on my right, and as regards the first division, "I am not quite certain, but believe it was also in column on the left of the "town."

In Giron's opinion the position was unfavourable:—

"interrupted, without supports, without defences, without line of retreat; in "fact, nothing more than the bare ground on which to place the troops."

General Arteche appears to have thought the position a good one on which to risk a battle provided it had been properly studied and strengthened by defensive works.

No one seems to have thought of such a thing as that; all believed they were to attack, and not to be attacked themselves in that position.

Giron says on this subject:—

"I am bound to state, with all truth, that no one undertook to examine the "ground except the staff of the division which arrived there first, and, believing "in good faith, that the enemy would not come to seek us there, there was "about as much security and the same neglect of indispensable precautions for "fighting with all local advantages fully availed of, as might have happened "in times of profoundest peace.

"At 10 p.m. the general commanding assembled in his quarters the generals "of divisions and the artillery and engineer commanders, and after explaining "to us, with all indispensable reserve, the circumstances in which the army "of Extremadura found itself, with respect to the British alliance, and to the "orders received from the Court, he invited our opinions. Of the two alterna-"tives, either to retire from there or to act decisively, the second prevailed, "and it was unanimously resolved to attack at dawn on August 12th."

As will be seen, the Council of War shared the imprudent views of Venegas. This fact is, and always will be, the logical consequence of the form in which problems are placed before an assembly of generals who maintain amongst themselves relations of such rigid dependence, are obliged to place so high a value on the opinion of their chief, and aim at deserving his favourable approval.

Once in a way, there may be divergence of opinions amongst them in a case when a chief, seriously depressed by unexpected reverses, proposes to them a half-hearted resolution; but no such assembly will venture to suggest counsels, modifying or moderating a bold and aggressive policy by him who is in supreme command.

Venegas was "spoiling for a fight" with the French, whom he believed to be inferior in numbers to his force, and the Council voted to a man in favour of resolute attack. Believing themselves to be in duty bound to take the initiative against an enemy still suffering

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from his defeat at Talavera, and from the lesson he got at Aranjuez, they announced the attack to take place at dawn on the 12th, and without heeding the fact that the enemy being already in possession of Toledo was in a position to select the hour most favourable to himself.

Giron relates as follows:—

"At dawn on the 11th the enemy's skirmishers exchanged shots, they being "on a ridge which they held firmly; our troops were resting, or at their "ordinary occupations when, about 7 a.m., I saw, from the balcony of my "house, whence I was observing the skirmishers, four heads of columns appear "at the summit of the ridge. By the numbers and by their disposition I knew "at once that they were there to find us, and mounting my horse I hastened "to inform the general in command, and to assemble my division. The troops "quickly fell in under arms, and thenceforward evinced a disposition and "confidence which gave every hope."

The unpremeditated combat commenced by a hurried formation, little calculated to impart to the minds of raw troops a serenity easier to attain when the chances of war are realized in accordance with a preconceived plan which convinces the soldiers that their leaders dominate the situation. An unexpected attack depresses recruits and leads to unforeseen events.

Continuing his narrative Giron states:—

"Soon the cannonade started on our left. The enemy made clear his inten- "tion to attack on that flank although his columns appeared all along the "front.

"The general commanding ordered me to keep in reserve with the four "battalions which remained to me of my division, since, shortly before I had "told off the Velez-Malaga battalion to protect a battery. Later, he directed "the Alpujarras battalion to take position on the Citadel hill with the two "12-prs. of my division, and thus all that remained to me were some Spanish "Guards and the 2nd battalion of Cordoba and Ecija; the divisional artillery "had been placed at the disposal of the officer commanding the artillery, and "the cavalry received their orders from the general in command."

But now comes in the important defect; the exiguity of the reserve which is a factor of increased value in a defensive action, where the attacker has it in his power to concentrate against the weak point, which it becomes necessary to hasten to the support of.

The want of corps artillery, forcing the artillery commanders to dispose of the divisional artillery, deprived the divisions of their essential adjunct, and they, weakened, moreover, by being despoiled at a critical period of their cavalry, experienced, not unnaturally, a certain amount of moral depression.

The battle commenced with a violent artillery duel of which the German writer Rigel says:—

"the fire of the Imperialists was of small effect, due to their having lost their "best artillerists at Talavera, and also because the Spaniards shot very well."

Giron continues:—

"I received an order from the general in command to take up a central "position *(centrificarme)* with my division; I therefore moved it towards the "centre, whence I had to march and reinforce the left, which was done with "the utmost promptitude, and, whilst actually on my way, I received another "order to strengthen the heights on the left, which was carried out in the best "order notwithstanding the very heavy fire which the enemy maintained on "us during our march."

The disorder which resulted was the natural cause of improvising. It is not necessary here to detail the phases of the battle, which are perfectly described in the illustrous Arteche's *magnum opus.*

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One detail, however, stands out in relief, viz., the vigour shewn by the Spanish battalions, all to the honour of the generals who in such a short time had developed the spirit and training of their men up to the point of rendering them capable of reforming their involved line by clever manœuvring under fire, and retiring in good order under the protection of Vigodet's division, supported by that of Giron.

But what the enemy's fire could not attain was effected owing to the want of a commissariat service.

This is what Giron writes in his diary:—

"The extraordinary fatigue and want of water and food, caused a dispersion "of the troops such as neither the hostile fire, nor the losses sustained in a "sanguinary and hotly contested action could produce."

What were these losses? General Arteche laments that only two of the divisions recorded their losses. We have before us the detailed statement of the casualties of the third division, dated in Las Correderas.

Units.	Killed.	Wounded.	Prisoners & Missing.
Spanish Guards	5	34	86
2nd Cordoba battalion	16	53	79
Bailen	6	22	87
Alpujarras	51	—	95
Jaen	21	48	94
Ecija	9	11	126
Velez-Malaga	3	5	70
Total	81	176	687

The considerable losses caused to the enemy[1] is a proof of the ardour of the Spanish troops, who were stimulated by the recent triumphs of Talavera and Aranjuez.

As regards the obstinate determination of Venegas to accept defeat rather than to retreat without fighting, he was probably guided by a loftier reason than the mere sting of *amour propre*; a powerful motive as to the strength of which it is not easy now to form any correct idea; we refer more particularly to the condition of the towns of La Mancha which were being occupied and re-occupied consecutively by French and Spaniards.

We noted, when describing the previous advance of Venegas, the pitying enthusiasm of the liberated population.[2] In their jubilant hope, the good patriots, oppressed by the *canaille* placed in authority by the French, hastened to despoil these of their ill-gotten power, openly manifesting with imprudent pleasure, their contempt for the vile tools of the hated invader.

What a tremendous revenge it would be for these despoiled sycophants if a retreat by the Spanish army should hand over the poor victims of confidence in the ephemeral power of their defenders, to the vengeance of the French, and of the renegade Spaniards who had thrown in their lot with the conquerors.

Like the badly beaten youth who paid dearly for the temporary and passing protection of the benevolent nobleman, by having to endure still worse treatment at the hands of his oppressor directly

[1] Viz: 319 killed and 2075 wounded according to Oman.

[2] See Part V.

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his protector's back was turned; and who, on once again meeting his erstwhile benefactor heaped curses on him in place of blessings; so did Venegas read in the chastened reserve and mournful gloom of the loyal inhabitants who were maltreated in his absence, evidence of a silent, but reproachful want of confidence in him.

There can be no doubt that with a view to dissipate this gloomy state of distrust he assured them that he should arrive in Madrid in conjunction with the army of Extremadura. At the same time he incited the patriots to once more seize the reins, which if left to unprincipled hands would be productive of much harm. And the thought of these unhappy beings abandoned once more to a vengeance which would be magnified a hundred fold, and having to listen to the lamentations of those who believed in his promises, whilst behind his back there resounded the triumphant horse-laughter of the bad Spaniards, should have led him to repent in sack-cloth and ashes of his desperate resolve.

Once defeated, he considered that he could resume, with his head high, the tragic road of retreat; his fault having been washed away in the baptism of blood; and the unhappy ones abandoned to their cruel fate would accept with resignation the common misfortune which wounded with the same rude blow both people and army.

(To be continued).

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A Divisional Artillery Staff in the Field

By CAPTAIN W. H. F. WEBER, R.F.A.

THE work of a Divisional Artillery Staff, when the C.R.A. is given control of the whole Divisional Artillery, differs from that of other staffs of similar standing, in that the units are distributed over a wider area (in the various parts of which the tactical circumstances differ), while the means for communication with those units are limited.

The following remarks may be interesting to some officers by way of comparison with their own experiences and may possibly be of use to others in the future.

The staff under discussion is that allowed by "War establishments, 1909-1910."

The units mentioned may or may not include the divisional ammunition column.

I. Suggested Organisation.

	Duties in the Field.	Duties in Camp.
1. Brigadier General	C.R.A.	
2. Brigade Major ...	(a). Reconnaissance and Orders. (b). Rough diary of events. (c). The service of intelligence as regards (i) The units (ii) The enemy's guns (iii) The general tactical situation.	(a). General Staff Duties. (b). War Diary. (c). Issue of Orders to other Staff Officers.
3. Staff Captain	(a). Disposition of the Staff. (b). Watering and feeding staff horses. (c). The service of communications. (d). Registration of messages. (e). Reconnaissance of watering arrangements on the march. (f). Allotment of camping grounds. (g). Rough diary of events.	(a). A.G. and Q.M.G. duties. (b) Camp Commandant. (c). Discipline of Staff. (d). Assist B.M. with war diary (e). Issue of orders to N.C.O. i/c signallers and orderlies.
4. A.D.C.	(a). Orderly Officer. (b). Rough diary of events.	(a). Personal Staff Officer. (b). Mess Secretary. (c). Assist Brigade-Major with War Diary.
*5. Q.M.S. (on bicycle)	(a). Assist Staff Captain. (b). Rough diary of events.	Q.M.S. and chief clerk.
*6. Clerk (mounted) ..	In charge of 2nd Line Transport.	Assist Q.M.S.
7. B.G.'s 1st Batman.	Horseholder to B.G. (3 horses)	Groom.
8. ,, 2nd ,,	With baggage (carries rifle)	Looks after B.G. and A.D.C.†
9. B.M.'s 1st ,,	Horseholder to B.M. (3 horses)	Groom.
10. ,, 2nd ,,	With baggage (carries rifle)	Looks after B.M. & Staff capt.†
11. S.C.'s 1st ,,	Horseholder to S.C. (3 horses).....	Groom.
12. ,, 2nd ,,	With baggage (carries rifle)	Officers' Mess waiter.†
13. ADC.'s 1st ,,	Horseholder to A.D.C. (3 horses)	Groom
14. ,, 2nd ,,	With baggage (carries rifle)	Officers' cook.†
15. N.C.O. i/c signallers	i/c Signal Station or Stations.	In disciplinary charge of all signallers and orderlies. Keeps duty roster.
16–18. Signallers.....	One horseholder (4 horses and) 2 Signallers	Camp duties and orderlies.
19–21. Mounted Orderlies (should also be qualified signallers)	One on foot up with S.C. (or B.M.). One on second bicycle. One holding 3 horses.	Camp duties and orderlies.
22. Cook.....	With baggage (carries 5th Rifle).....	Mens' cook.

* Duties interchangeable.
† Camp duties interchangeable to suit circumstances.

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II. DUTIES IN THE FIELD.

(a). Reconnaissance:—

It may be possible for the C.R.A. himself to do all the reconnaissance necessary, but often the ground to be reconnoitred will have to be divided up amongst the Staff. The work has to be carried out quickly, perhaps over enclosed country; it is hard on the horses and as few as possible should be taken, the bulk remaining with the staff captain at head-quarters. If the C.R.A. may have to communicate with his units while on the move, his signallers will have to accompany him, and it is at these times that the units must be especially on the watch for a call-up; touch should be kept between the C.R.A. and the units when possible even if only to keep the latter informed where the former is.

The need of reconnaissance by the Divisional Artillery Staff never ceases when once an action has commenced, and the amount carried out is chiefly a question of saving horse-flesh. A good deal can be decentralised to the units. Immediately a unit occupies a fresh position, likely positions in its immediate neighbourhood should be reconnoitred and a report of them despatched to the C.R.A.

(b). The Service of Intelligence:—

The C.R.A. is well placed for helping the G.O.C. with information concerning the enemy and the general situation.

The collection of complete information about the various artillery units is equally important; and it is surprising how an apparently unimportant item enables an important deduction to be made later in the day.

(c). The Staff Captain and the Q.M.S.:—

Theoretically, the Staff Captain is always with the bulk of the Staff at Divisional head-quarters; in practice it is otherwise. He may have had to stop in camp for a time to arrange various matters; on the march, he may be reconnoitring watering places—which is a big task when several artillery units form part of one column and are to be watered in a short time without blocking the road; he may be with a representative of Divisional head-quarters selecting or allotting camping spaces. Sometimes he is the one remaining Staff Officer and is sent off by the C.R.A. with a message.

If the system of consecutive numbers for messages up or down each separate channel of communication should become the normal one (there is one up and there are six down, not to mention side-paths), it is absolutely necessary that some one person should be put in charge of the registration of messages, otherwise the numbers will get mixed up and more confusion than benefit will result from a system so excellent in theory.

It is for this reason that it is suggested that the Q.M.S. or the clerk be brought up as the staff Captain's assistant; but there will be times, as when on the march outside the sphere of battle, that this assistant's presence will be unnecessary.

(d). Diaries:—

All three staff officers and the Q.M.S. should make a habit of

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noting down, independently of each other, the times of the various important events as they occur. The Staff gets easily separated, and it is only by comparing these notes that the Brigade Major can hope at the end of a busy day to make out his war diary. What help he can hope to get from the units is not easy to say. He should be able on most occasions to obtain about sunset a very rough account of its day's doings from each unit—and this he must get; but the unit commander is by no means absolved thereby from keeping a war diary of his own in much greater detail.

It is most trying to have to sit down late in the evening and write out the diary for the day by the light of a spluttering candle, while someone in the tent or room wants to go to sleep; but unless it is done each night, the diary will assuredly lose accuracy, and one cannot foresee when reference to it will be rendered necessary by the course of events. An inaccurate diary and its writer had better be consigned to the flames together.

(c). Signallers and Mounted Orderlies:—

Signallers and mounted orderlies should be interchangeable. Apart from the question of replacing casualties amongst the signallers, there will be moments when the existence of a second (improvised) station will be of the greatest value to the C.R.A. For instance, he may want a travelling "Station" with him on reconnaissance, while leaving the other at head-quarters; the whole division may be on the move and the divisional Telegraph Co's communication temporarily broken and the distances or country unsuitable for mounted orderlies—this is quite a common state of affairs in the attack; a quick change of position of head-quarters may necessitate one party's stopping behind to send off the news, while the other goes on with the C.R.A. to open communication from the new position.

The constant demand of signallers from the units is most trying to the latter, whose efficiency is seriously impaired thereby. The only remedy appears to be the training of a larger proportion of the personnel.

The N.C.O. in charge of signallers is such an important personage, being responsible not only for the station work in the field, but for the discipline of the six men under him and their correct performance of camp duties, that it would undoubtedly be advisable on service to give him from the day of mobilization the rank of corporal or even serjeant. At least two other men out of the remaining six should be men with considerable service as N.C.O's—say one full bombardier and one acting bombardier; and promotion should be carried on in the staff on this scale.

On the march the Corporal must report to the Staff Captain at each halt whether the seven horses in his charge are all correct or otherwise. In the field he reports himself at once for duty with his signallers, and brings up the orderly (whose turn it is) to be within reach of the Staff Captain's voice. The other two orderlies remain with the horse party until the first has gone on a message. The second then takes his place with the Staff Captain, the first joining the horse party on return from his journey.

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(f). Bicycles:—

It is laid down in "War Establishments," that bicycles are for "intercommunication." Now a bicycle is an awkward thing when marching with a mounted party along a narrow road; what is more, it empties a saddle. Once in position for a fight however, a bicycle orderly is often far more useful than a mounted man, if only he avoids a puncture. It is suggested here that the Q.M.S. rides one, and one of the mounted orderlies the other, but there will surely be times when the bicycles are no pleasure to their wheelers—even cushioned-tyred machines—and little likely to be of use to the C.R.A.

Either a horse or a bicycle is a most welcome addition to the baggage party; and when on the march and out of reach of the enemy, the bicycles would appear to be better employed there than at the front. All possible efforts must be made to save the men with the baggage; their work only begins on getting into camp.

(g). Evening duties when close to the enemy:—

When intimate touch has been obtained with the enemy and artillery units are well distributed, it is advisable where possible for a Staff Officer to visit each unit before the Staff turns into camp for the night. Such a personel interview will put the C.R.A. in touch with his units better than a dozen messages, though it may mean a trying journey for a tired horse.

Probably the Staff Officers will each visit one or more units as convenient. It is advisable for them to take a mounted orderly with them, so that one orderly will know exactly where each unit is, should it become necessary to send round a message later in the night.

Failing a visit from a member of the C.R.A's Staff, the unit commander should as a matter of daily practice, send an officer to artillery head-quarters, directly action appears over for the day, i.e. at dusk, to explain his situation.

III. Work with divisional head-quarters.

Up to now we have been concerned chiefly with "domestic details." The present paragraph goes rather outside the scope of this paper, but has been inserted to account for the basis on which later paragraphs are written.

Artillery is present to help to win the battle. It is put under the C.R.A. because, being under one man's control (and he in intimate touch with the G.O.C.), it can better so carry out the G.O.C's ideas as to its employment. The C.R.A's Staff may at times be of use to head-quarters, it must never be an encumbrance.

(a). In the field:—

It would doubtless be easier to keep up artillery communication with a larger staff. Apart from the improbability of getting a bigger staff sanctioned in "War Establishments," every man, horse, and vehicle makes head-quarters more cumbersome—and the Divisional Artillery Staff should consider itself part and parcel of head-quarters. Under section "Communications," therefore extra staff has not been considered, except to meet special contingencies.

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The C.R.A. is with head-quarters at almost all times; when necessarily absent on reconnaissance, he is replaced by a Staff Officer.

The C.R.A's Staff must be out of the way, yet, like its chief, always ready—hard conditions to fulfil.

The signallers must be placed wide enough not to get mixed up in the distance with the Divisional Signallers; but they should be available and ready for employment by head-quarters in the common cause, if the need arises.

(b). On the march:—

It has worked satisfactorily on the march for the Brigade Major and the A.D.C. and one orderly to accompany the C.R.A. with head-quarters, and for the Staff Captain to keep the main body of the staff at a convenient place near the head of the column—perhaps at the head of the Divisional Artillery behind the leading infantry battalion, if the order of march allows of it. Of course it is more convenient for the C.R.A. to have his whole staff with him.

(c). In camp:—

The Divisional Artillery Head-Quarters camp should be part of the Head-Quarter Camp, which, however, would not necessitate worrying Head-Quarters with the bother of feeding extra mouths, or of supervising an extra "cleaning area."

No recognised system obtains yet as to the issue of the daily operation orders to artillery units. It is outside the scope of this paper to discuss the point in detail; though it may be fairly said that the issue of Divisional Artillery Orders by the C.R.A. (in the same way as Brigade Orders are issued to his battalions by an Infantry Brigadier) makes it quite clear under whose orders any particular unit is.

Whether or not artillery details are included in Divisional Orders and a copy of the latter issued to artillery units, in practice the Brigade Major generally has to meet representatives of units after Divisional Orders are issued. The proximity of the C.R.A.'s camp to Head-quarters of course hits either the Brigade Major who has to journey to where the units are camped, or the adjutants who have to come up to the C.R.A's camp. This cannot be helped. The normal method would be for the adjutants to come to head-quarters, and such a conference would provide an opportunity for exchange of all sorts of useful details of information.

IV. Communications.

The control of the whole Divisional Artillery from a central point requires perfection as regards communications; and the difficulty of communication forms the usual excuse for splitting up the artillery *ab initio* amongst the infantry brigades.

The normal means at disposal are:—

(i). The divisional telegraph company.
(ii). One C.R.A's station of three signallers.
(iii). Three mounted orderlies.
(iv). Two bicycles.

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(i). Divisional telegraph company:—

The divisional telegraph company forms various divisional signal stations. At the head-quarter station there is a divisional staff officer to whom all messages are handed and a corresponding official exists at the other stations. The C.R.A. is in verbal touch with the head-quarter station; but the artillery unit commanders are rarely alongside the other stations, so they are made responsible for linking up their own head-quarters with the nearest of these divisional signal stations.

Where the divisional signal station and the artillery units are both likely to remain some time in position, as in the defence, the latter's telephone wagon could have its sphere of activity enlarged for inter-communication between the two.

Such use of the brigade telephone wagon may not have been contemplated, but what other solution is there? At present more wire is provided to the artillery than there are reels to carry it; here is a good reason for providing enough reels to put into use even the "spare" wire.

When either the divisional signal station or the unit (or both) are on the move, recourse must be had to flags, or better still to mounted orderlies.

The use of the divisional telegraph company is somewhat hampered by a number of regulations which have doubtless been initiated for excellent reasons, such as having to write all messages on a certain form and in duplicate, etc. They can easily be followed; and it behoves all officers and orderlies to understand them thoroughly for the good of the common cause.

The maintenance of communication between himself and the nearest divisional signal station is a very important duty of the unit commander; it must almost always be arranged, even though good fortune may, for the moment, allow of communication with the C.R.A., being kept up independently of the divisional telegraph company.

In spite of the foregoing remarks, the Staff Captain will be well advised to do without its help as far as possible, when he has once assured himself of its efficacy in each position.

(ii). C.R.A's Signallers:—

There is only one flag station with the C.R.A's Staff under present conditions, and it becomes absolutely useless if attempts are made with it (i) to communicate in several different directions (ii) to send long operation messages.

Its most important use is during reconnaissance when the C.R.A. wishes to communicate with a certain unit and there is no divisional signal station at hand. Unit's stations cannot follow up the C.R.A's party too closely, or, when they themselves are on the move, watch too carefully for a call. Technical difficulties ought not to be allowed to interfere with the necessary practice of signalling from on horseback—often it is merely to indicate the presence of someone, somewhere that a call is sent.

The commonest use of the C.R.A's signallers is when one unit is situated wide of all divisional signal stations.

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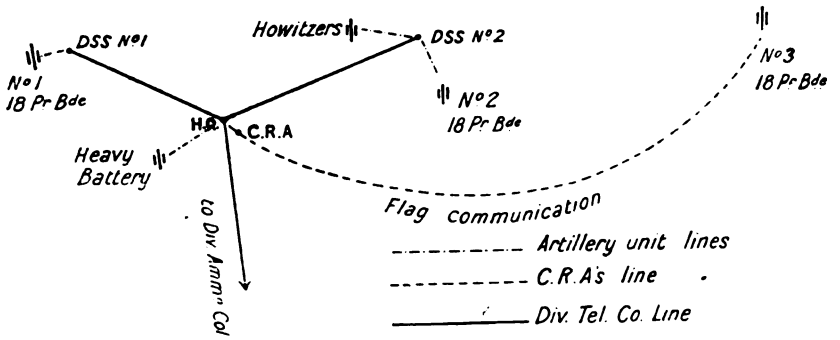
The following is an ordinary state of affairs:—



It is highly desirable for reasons discussed under II. "Duties in the Field," that the mounted orderlies of the C.R.A. should also be qualified signallers. A second station could then be improvised to meet contingencies. No extra equipment besides that allowed in the G. 1098-17 would appear to be necessary.

Occasions may arise here and there for a closer and more formal control of a number of units by the C.R.A. (or his deputy), from some particular station not alongside the G.O.C. To meet this special case, it will be necessary to borrow from the units for a time, sufficient signallers, telephonists and telephone materiel to organize the required communications.

(iii). Mounted orderlies:—

Leaving the C.R.A. his three mounted orderlies for special errands, each unit can send an orderly of its own to the C.R.A. first thing in the morning. Another orderly could be sent with important information as occasion demanded, the first orderly returning to the unit and so saving a horse a double journey.

This suggestion is chiefly for the time when the opposing forces are in close conflict and the mounted orderly becomes the chief means of communication.

(iv). Bicycles:—

The employment of bicycles has already been discussed under II. *(f)*.

Artillery communications need a lot of practice and we really get a hard test at manœuvres—where messages come and go with such frequency that the countryside is full of soldiers galloping to catch each other up with yet another order, where horses are scarce commodities and men are "doubling the parts," and nearly everyone is "doing it for the first time." It must be remembered, too, that when divisions are not working singly, the front occupied by each is less extended, and communication proportionately less difficult.

It does not appear to the writer that sufficient experience has yet been gained to warrant a demand for a permanent increase of the divisional Artillery Staff.

Communication is the crux of the whole question of control by the C.R.A. The nearer the division gets to the enemy, the more

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elaborate becomes the system, until we reach the climax when—not only in the artillery but throughout the division—the hold is bound to slacken, and artillery (like all other) sub-commanders have to act without orders on their own initiative. Intimate co-operation with the troops in the immediate neighbourhood may become the only possible course of action and all else be forgotten; the unit commander can but let the C.R.A. know as occasion offers where they are and what they are doing. In some battles as at Pieters Hill, control is easier; in some, such as Vionville-Mars la Tour, the fight is constantly swaying this way and that, and control would be harder. If the artillery under the C.R.A. has served the purpose of the G.O.C., by its distribution and method of employment in the early stages, there is nothing to prevent its intimate co-operation with the infantry, with or without the C.R.A's orders, in the latter stages of what may have become a running fight.

V. Duties in camp.

(a). Brigade Major and the Staff Captain:—

In dividing the correspondence between the Brigade Major and the Staff Captain, the natural line to follow is that laid down in the "Field Service Pocket Book," 1908, chapter 1, p. 25. The difficulty in practice is to steer between duplication and omission of work. Each must be prepared to answer to all comers for both, and to deny to himself the perfectly justifiable explanation that such and such a thing is not his "pigeon," in the slang of the day.

All three Staff Officers have their work well cut out for them, but, once in camp, the Staff Captain seems to become the goal of everyone's enquiries; and it amounts to his being quite unable to leave camp without appointing a substitute in his absence; for the mundane matters of transport and supply require immediate attention. The other Staff Officers can help him a good deal in his somewhat uninteresting duties, especially by their presence in camp allowing of his absence.

(b). Q.M.S. and Clerk:—

As in all units, a great deal depends on whether the "fighting line" or the "second line transports" gets into camp first. The first duties to be performed in any case are:—

(i). To get ready the correspondence for the C.R.A.

(ii). To find out where supplies are to be drawn.

And on arrival of the 2nd line transport.

(iii). To empty the water-cart and get it refilled.

(iv). To empty the 2nd line transport of supplies and refill from the T. and S. Column.

Whichever of these two N.C.O's is marching with the baggage must be prepared on certain occasions to represent the Staff Captain, and as Camp Commandant, mark out the staff camp.

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(c). Signallers and mounted orderlies:—

The "main body of the staff" is collected both on service and manœuvres from various sources. It is absolutely necessary to initiate at once a good practical system for the performance of duties and to make the "corporal" responsible for the upkeep thereof.

The whole of the camp kit should be told off by the Q.M.S., under the Staff Captain, to the various individuals, so that each man knows his own job when pitching or striking camp. Not only does this tend to quickness, but it is also the only way to account for loss of stores.

Whenever possible, a regular stable hour should be kept, and the Staff Captain or one of the other officers should visit it. If the horses come in before the 2nd line transport, they should be groomed at once; it helps to pass away the weary period of waiting and sets everyone free for the arduous moments immediately succeeding the arrival of the wagon. Arrangements for shoeing must not be forgotten. The "corporal" is in charge of stable hour and keeps the shoeing list.

Signallers and mounted orderlies are best put on one roster for duty. One orderly must be ready, day and night, mounted or on a bicycle, to take a message. It must be clearly understood who is next and second next for duty, for several messages may have to go at the same time; the ready attendance of the orderly on duty when called for is of the first importance, even if only to ease the mind of the Staff Officer. The "corporal" keeps the roster. It may here be mentioned as wise to make an invariable rule of sending every *message* in one of the service envelopes (A.F., C.398) provided with a space for the signature of the recipient; otherwise important communications have a knack of getting "left on the office table" or "under the flap of the Major's tent."

Besides the above, one man must be told off as in-lying piquet, whose duty it is to remain near the horse line day and night.

The above sounds elementary; but in practice the case is quite different from that of the combatant unit with its elaborate chain of responsibility and ample personnel, for every officer and senior N.C.O. on the staff is a "specialist." Even packing up in the morning is different, for there is no proper dismounted party. During the early days of the Staff's existence-in-being, it will behove the Staff Captain to carry through his system with a firm hand, else loss of stores and unpunctuality will assuredly take place.

(d). Men's Kitchen:—

It need hardly be said that one of the Staff Captain's most important duties is to see that men's cooking menage runs smoothly.

VI. Training.

All this needs careful training of the staff itself. Divisional Artillery Training provides practice for, but is not the time for training, the staff. The responsible officer will be well advised to get together his men for a week or a fortnight before Divisional Artillery

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Training commences; this could generally be managed out of the training grant.

With all the individual training we carry out, it is odd how indifferently many mounted orderlies read a map, how readily they trot out into the enemy's lines bearing our most secret instructions in their hands, and how precious and rare a commodity a really first-class signaller is. Orderlies must be taught the service method of delivering a message, unless they wish to learn it in a more public place later on; the general round of duties must be explained; above all the men get to know the idiosyncracies of those they are to work with and under.

VII. Equipment and Transport.

(a). Instruments, etc:—

The office should have at least one complete set of sketching materials with it, including a cavalry sketching case. It will come in useful. One of those alarm-watches is a useful article, too, to remind people of appointments etc., in camp; they are made with a luminous dial now, and look as if they would stand shaking about.

(b). Officers' mess kit:—

A mess kit for six, which allows of an attached officer or a guest or two, will do a Divisional Artillery Staff very well. Including a 30/- oil-stove, a round table made in two halves to bolt together round the tent pole and supported in the centre by upright T-pieces lashed on to the pole, a box for drinks with lock and key, and other useful and necessary camp commodities, the kit (in enamel) can be purchased for £7. If care is taken to clean the stuff at the end of each period in camp, and a small charge is levied from dining members to replace losses and make good damage, it will save a lot of trouble each year as regards messing and the kit should last for years. The initial cost is of course a nuisance. The oil-stove burns well, but needs shelter from the wind. Wicker cases are wanted for nearly all glass articles, including the lamp.

(c). Small arms:—

Six rifles and six slings are kept for a Divisional Artillery Staff, but no buckets. This points to their being intended for the baggage guard. They would of course be carried by the five men forming the guard (Nos. 8, 10, 12, 14 and 22, Sec. 1, Organisation); it is rather difficult to see who could conveniently carry the sixth.

The arming of orderlies has presumably been considered and decided on elsewhere; certainly a man carrying a message had better trust his horse or wheel than his revolver.

There are no fire-arms with the first line, according to present arrangements.

(d). Tents:—

It has worked well to take six bell tents, one for the B.G., one for the officers, one for the mess, one for office, clerks, and bicycles,

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and two for the men. A spare one should not be despised, if it can be carried.

(e). Transport:—

For convenience in drawing rations, and packing up of a morning, a number of small vehicles is better than one big wagon; but a future organiser of such a staff will be well advised to beg, borrow, or steal Government horses and soldier drivers; for the Staff Captain is apt to be too busy in camp to be able to talk into a good humour a party of hired drivers in charge of vehicles of uncertain draught and carrying powers. The writer's experience extends to one such driver who becomes weary of the "luggage-train" method of progress; so at the next stop he took his horse out and rode it away across country towards a village he knew, "to get a drink." Only a fortunate fall over a boggy ditch enabled the incensed transport officer to retrieve the horse. The driver was not seen again.

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Effects on Coast Defence of Naval Developments of the last few years.

By "BELLFIELD."

IT is difficult to discuss this subject from any point of view without plagiarizing to a very large extent on the exhaustive article by Colonel W. R. W. James in the May number of the "R.A. Journal" entitled, "Problems involved in the defence of Coast Fortresses," and such being the case, we hope no further apology will be needed if many of our present conclusions appear to be based on his arguments. In the article in question convincing proofs are adduced showing the absolute necessity of coast defences—not coast defences of mobile batteries as favoured by some writers who have perhaps a cursory knowledge of the subject—but coast defences consisting of carefully sited fixed armaments, electric lights, and range-finding instruments, all linked together by a reliable system of communications. These proofs lead us to the general conclusion that the all round increase of naval power makes it of vital importance that our coast defences must be strengthened in a corresponding ratio.

Considering recent naval developments in detail, the most important changes that affect coast defence, of late years, seem to be:—

1. Increase of gun fire power.
2. Development of the submarine.
3. Increase in size and power of torpedo-boats.
4. Increased use of blockaders and boom-smashers.

Of these headings, the first is much the most serious consideration owing to the large number of heavy guns mounted by the modern battleship and cruiser of all the great naval powers. This may be well exemplified by comparing the total weight of a broadside from the St. Vincent, which was laid down in December, 1907, with that of one from the Lord Nelson, which was launched as recently as 1908, that is just before the "Dreadnought" era and while the St. Vincent was still building. In the former case the weight of a broadside is roughly 7200 lbs. (all these figures are given in round numbers) and in the latter it is only some 5400 lbs. Going back a few years further we find that the "Ocean," completed in 1900, can only show a broadside of 4000 lbs. compared with something like 13,000 lbs. of the unfinished "Orion."

From these figures it is obvious that the gun power of ships is increasing at a tremendous rate, in fact one wonders when the limit will be reached, and how long the different nations will continue "to go one better" than their rivals. Now turn from the ships to the shore and see if the primary armaments of our coast defences are being correspondingly strengthened.

It is said that figures can be made to prove anything, but, at the risk of being considered too statistical, we will venture to give some

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hard facts about the "progress" of our fixed armaments from 1905 up to the present date, that is to say during much the same years in which we have glanced at the naval increase in the same direction. To do so we will take two examples of what has happened in the case of two typical coast fortresses, one at home and one abroad; the names of the particular places do not matter, but suffice it to say that they are both places of by no means secondary importance.

At the home station in question in 1905 there were 41 guns of all descriptions available for the defence of the dockyards in rear, giving a total "broadside" of about 8300 lbs., not, of course, that the whole of the armament could actually fire at the same target at once. In 1909 there were 19 guns, with a broadside of 2700 lbs., defending the same port. The remainder (two new guns had been added) were either dismantled or in reserve, which is for all practical purposes the same thing, seeing that there is neither personnel available to man them nor stores at the station for use with them. It is freely admitted that many of the original 41 guns were of obsolete pattern, but with the exception of the two guns mentioned, nothing has been done to replace them.

Turning to the colonial station we find the following facts; five years ago there were 16 guns guarding the entrance to the harbour, with a total broadside of 1660 lbs., now there are four guns left on the active list with a broadside of 960 lbs.

Judging from these instances, the recent naval development of gun fire power has been accompanied, not, as one might expect, by a similar increase in the power of coast defences, but by a very material reduction; and this in spite of the fact that the "reduction of armaments" theory is supposed to be quite exploded. Let us try to follow the reasoning that has led to this apparently unreasonable line of action.

Some twenty years ago the opinion seemed to prevail that the fixed armament of a defended port might have to reckon on the possibility of being engaged in a regular pitched battle with several hostile battleships or cruisers. As a matter of fact such was exactly the case of the Spanish coast batteries at Santiago in the Spanish-American war, as recently as 1898, when the American fleet steamed past the forts at a range of under 3000 yards and poured a tremendous fire into them. (As it happened there was practically no damage done to either personnel or material in the forts as the detachments went under cover and there were no direct hits on any of the guns). By this time, however, any chance that the Spanish may have ever had of holding the command of the sea was almost certainly lost as their fleet lay huddled in the narrow Santiago harbour unable to venture out to try conclusions with the stronger American fleet which was blockading it. Still there is this to be noticed, that the American ships could not risk entering the harbour under the point blank fire of the guns mounted at the entrance.

Now the modern theory is that we take it for granted that we have command of the sea, and the only danger to be feared by any of our fortified ports (not taking into account torpedo-boat raids, which we will come to later) is from an odd cruiser or two that may have evaded the notice of our fleets. Another idea is that the modern type of battleship, costing something like £2,000,000, is too precious an article to be allowed to run any risks of being damaged

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by fire from a fort when its real rôle lies in the attack of the hostile ships in line of battle. Here we would like to quote two sentences from Colonel James' article: "There is nothing inherently improb-" able in ships engaging a fortress, either with the idea of silencing " the batteries, or more probably in order to disorganize the light " Q.F. defences and thus prepare the way for a torpedo-boat attack." Again: "Ships, at any rate at the present moment, are not so very " vulnerable, especially considering the 9·2″ is our largest modern " gun mounted in fixed defence."

This last sentence seems to contain the crux of the whole situation, namely, that we ought to have something in the nature of a 12″ gun for our primary armament of coast defence. It is quite conceivable that at a defended port in some part of the world (possibly even in home waters) we might happen to have lost the command of the sea for the time being and our ships might have been roughly handled and have gone into port to refit. Now we may take it for granted that the hostile fleet would follow up its success and try to bombard our ships in the harbour unless we have fixed defences able to make the enemy keep at a respectful distance. In other words, we would require as powerful a gun as that carried by the ships which we would have to engage. Turning to recent history we have excellent examples of the inefficacy of insufficiently powerful coast defence armament. On the 9th February, 1904, the Japanese fleet bombarded Port Arthur with their heavy guns and, according to the Official History of the war, the range was so great that very few of the Russian guns were capable of making an effective reply to the heavier Japanese weapons, and "confusion reigned throughout the " fortress." In a later bombardment, in March, about 150 12″ shells were dropped into the town and harbour, and again "the coast " batteries were incapable of inflicting injury on the Japanese vessels." During the blockade of Santiago by the American fleet the Spanish forts had no fixed armament heavier than a 6·3″ B.L. of very old pattern, with the result that the American ships were able to steam past at a range of under 3000 yards, but if there had been good primary armament on shore, this could never have been attempted and the Spanish warships in the harbour might have had some chance of slipping out on a dark night.

Again, modern armoured cruisers have better protection than formerly, just as they have also increased gun power, and they are the most likely type of ship that our coast denences will have to fire at while we still have command of the sea. They are the ships which would be engaged in the work of escorting blockaders and boom-smashers and it is obvious that it would be of the first importance to put such escorts out of action at the farthest possible range, so that the secondary armament could deal with the unprotected blockaders without the probability of its being overwhelmed by the fire from the cruiser, for it must be remembered that the gun power of one fair-sized cruiser is superior to that of most of our fixed defences at any one port which could bear on the same target at once.

Submarines:—

Now coming to the question of submarines, their present rôle is mainly as an adjunct to the defence of a port, but doubtless they

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will soon develop into assisting the attack, so our coast defence ought to have some means of coping with them. Some of our most important dockyards are not so far from foreign naval bases that they can be considered immune from possible attack by this invisible enemy, but it is difficult to see how the guns of the fixed armament can deal with such an attack unless the submarines rise to the surface unexpectedly. Even at short ranges it would be too much to ask the most skilful Q.F. layer to take a periscope as his target.

Submarines will have to be met by submarine, but one cannot help regretting the abolition of regular minefields and the Brennan torpedo installation, which in narrow waters was a very certain instrument of destruction. After the important part played in the naval operations of the Russo-Japanese war, it seems to be assured that mining will enter largely into any future naval war, and, as a means of coast defence, the moral effect of knowing that a port is protected by a minefield is by no means the least powerful deterrent to a possible attack. Both the Russians and Japanese lost large ships from mine explosions although there was no system in sowing the mines, and if it had not been for them, Port Arthur would no doubt have suffered much more severely from the fire of the Japanese fleet, which very soon gave up coming too close to the port as entailing too much risk.

The effect of the introduction of the submarine has, therefore, been to abolish mining, at any rate systematic observation mines, as one of the agents of coast defence and to give us the submarine in exchange. Whether the latter will be as effective as a minefield in difficult channels is a question upon which opinion is still divided, and will be divided until the submarine has been tried practically in actual war. Unfortunately in neither of the two modern naval wars did any of the contestants make use of submarines, so their future use is to a large extent problematical.

One suggestion that might be advanced to assist in keeping hostile submarines out of a harbour is whether it would not be possible to hang something in the nature of torpedo netting from the boom at the entrance to the harbour. In places where there is a strong tide the idea would very likely not be feasible, but at some ports it might prove useful and the present delicate type of submarine would scarcely care to try and charge through a heavy netting.

Torpedo-boats:—

As regards the development of the torpedo-boat and destroyer there is not the slightest doubt that our anti-torpedo-boat coast defences require re-arming at once. It has been unquestionably proved that a 12-pr. is too light a gun to put the modern large and swift destroyer out of action with the rapidity necessary. It is again the question of a considerable increase on the part of the ship accompanied by no corresponding increase on the part of the fort, though just as the 6-pr. was superseded by the 12-pr., so ought the 12-pr. to retire before the superior claims of the 4″ Q.F. We have heard many rumours during the last five years or so about the proposed re-armament of the light Q.F. batteries, but except for some batteries in the Mediterranean, the rumours do not appear to be materialising very rapidly. Nevertheless it seems to be fairly well understood

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that the conventional method of declaring war in future will be to make a torpedo-boat raid on some important harbour of the enemy, and the chance of damaging one of our few "Dreadnought" docks would be a very tempting lure to a hostile flotilla. Coming, as they certainly would, in large numbers, we need a gun the shell of which can do sufficient damage to put a torpedo-boat out of action by one hit, so that the gun can be immediately switched on to the next target.

Though more a political than a naval development, this subject of the more or less unexpected raid affects coast defence very greatly as our present "precautionary period" would quite possibly turn out to be "a snare and a delusion." Great Britain is unlikely to be the aggressor in such a raid, partly because of the strong influence of the "peace at any price" party in the country, and partly because of the feeling that it is unsporting to start, as it were, before the whistle blows, so the attack would probably fall on our coast defences while they were waiting in the embryo precautionary stage. It is no doubt a very effective piece of work at annual manœuvres—passing from one stage to another on receipt of a telegram from the General Staff—but when there is any idea of real war it would be advisable to go to the war stage at once, or the magic telegram may be found to arrive too late at the port to which the enemy turns his premature attention.

Blockaders.

The use of blockade ships and boom-smashers can scarcely claim to be a very modern development in naval warfare, but in both the recent naval wars from which we have already taken examples, there were strenuous attempts made to blockade the enemy's fleet in a harbour where it had retired for refuge. The Japanese made several attempts to block the entrance to Port Arthur with ballast laden vessels, with the result that Admiral Togo was able to report that "the entrance appears to be completely blocked to the passage of cruisers and larger vessels." At Santiago the Americans tried to close the harbour by sinking the collier "Merrimac" at the entrance, but though it was sunk in the position intended, the channel was still wide enough for the Spanish ships to get past the obstacle in their attempt to escape.

Our present secondary armament of 6-inch guns is not heavy enough to sink a well ballasted blockader at the distant range necessary (proof of this is given in Col. James' article in the case in which 6-inch shell, fired at point blank range, were unable to sink a coal hulk), so for this purpose we would need to use the 9·2″ guns, which, according to our present armament, would be wanted to engage the escorting cruisers.

The conclusion of the whole matter based on the foregoing arguments is that our present coast defences require an all-round increase in power to keep pace with the rapid advance of naval developments; we want 12-inch guns to take the place of the 9·2-inch, we want the 9·2″ to take the place of the 6″, and 4″ to take the place of the 12-pr. The Blue-Water theory may be perfectly sound, but it is imperative to have really strong coast fortresses in case of the theory being temporarily upset.

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Effects on Coast Defence of the Naval Development of the last few years.

By CAPTAIN T. W. SAIDLER, (Forth) R.G.A.

THE coming of the "Dreadnought" the "all big gun" battleship in 1907, is held to have initiated an entirely new era of naval development, and we may thus properly consider what effect this has had, and will have, on the Coast Defences of the British Empire.

At the first glance the inauguration of a type of war ship carrying ten or twelve 12-inch guns in the place of a ship carrying only four of these weapons appears an overwhelming advance in the powers of attack, and against other warships, or against the old iron shielded masonry, and iron plated forts of the 1860-70 period this is doubtless so.

But these forts were already outclassed by the gun. Designed to resist attack from the 12-in. R.M.L. firing every two minutes or so, a projectile weighing 614 lb., with a muzzle velocity of 1,300 feet per second, a muzzle energy of 7195 ft. tons, and a penetration into wrought iron of 15 inches, they were hopelessly overmatched by a 12-in. B.L. gun such as was carried by the older battleships, firing an 850lb. projectile *four* times in two minutes or oftener, with a muzzle velocity of 2450 feet per second, a muzzle energy of 33940 ft. tons, and a penetration into wrought iron of 34 inches.

Newer and more powerful guns of 12-in. calibre have since been introduced and a 13·5″ gun with some 60,000 ft. tons energy is now being introduced into our own Naval service for the "Lion" and probably the "Orion"; and other countries are following suit, the United States with a 14-inch gun, and Germany with one of a similar calibre.

The effect of heavy gun fire on such structures was demonstrated only too clearly in the Shoeburyness experiments in 1883. The 80 ton R.M.L. gun firing a palliser chilled shot of 1700lb. weight, with a muzzle velocity of 1588 feet, penetrated two 8 inch iron plates, and ten feet into the granite behind, cracking it for some distance all round the point of impact.

Where it was impossible (as was generally the case) to strengthen these old forts by the addition of extra plating, they have for long been relegated to a second place, if not actually abandoned as a part of our Coast Defences, and against the fire of a "Dreadnought" or "Invincible" not to speak of a "Lion" or "Orion," they would simply prove death traps for their unhappy detachments.

In the case of modern earthworks of the type now scattered round our coasts however, the effect of the new development is not so striking. In a modern work the guns are, as far as possible, mounted at a height above sea level, are widely dispersed, the emplacements sunk below the natural level of the ground, only the gun itself, with a stout steel shield to protect the carriage and loading and laying numbers, appearing above the surface.

In the 9·2″, the principal weapon of our Coast Defence, the target offered to an approaching enemy is thus only about 15 feet

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by 6 feet, a very small target indeed at a range of 6,000 or 8,000 yards. But small as this target is, it is all that a hostile warship has to fire at. A shot falling short only throws up a shower of earth and stones, or ricochets harmlessly over head; one going too high does no injury whatever to the battery, but buries itself in the distant hillside, or splashes aimlessly into the sea. Nothing but a direct hit on the gun or shield will do any harm to the battery or put a gun out of action.

But to put a 6-in. or a 9·2 gun out of action does not require a hit from such a ponderous weapon as a 12-inch gun, the shell from a 6-inch gun is all that is required—it is number, more than weight, of projectiles that would tell in the attack of a coast battery. Now one of the older battleships mounting four 12-inch and twelve 6-inch guns, could fire on the broadside all her 12-inch and six of her 6-inch. Each of the 12-inch could discharge in a minute two rounds, or in all 8 rounds. Each of the 6-inch, at a very moderate estimate, 6 rounds a minute, or in all 36 rounds, or 44 projectiles a minute. Against this the "Neptune" could fire two rounds a minute from each of her ten 12-inch guns—all of which can bear on the broadside, although not on other trainings—that is 20 rounds a minute. Of course the "Neptune" would add to this the fire of a number of 4-inch Q.F. guns, but these are probably too small to do much harm. The "Dreadnought" herself and some of her earlier sisters can only bring eight guns to bear on the broadside, and they have no secondary armament larger than a 12-pr.

To add to the difficulties of the attacking ship most coast batteries are now as carefully concealed as possible, the sky line avoided, and guns painted to harmonize with the adjoining ground, so that it is very hard for the gunners on the ship to get anything very definite to lay on.

The position finding station may be hundreds of yards away from the guns and absolutely invisible from the sea, and is probably in duplicate, so that even if one were wrecked by a chance shell, the service of the gun by the other would go on practically as if nothing had happened.

Therefore, as before said, nothing but a direct hit on the gun itself or shield, does the slightest harm to the battery.

On the other hand the ship is exposed from stem to stern. A vessel 500 feet long by 30 feet freeboard, broadside on, offers a target of 15,000 square feet, against the 90 square feet of the gun on shore. Nine to eleven inches of hardest steel may protect its vitals, but still large parts of its sides bear only two to three inch plates, while still larger parts are entirely unarmoured. Most of its Q.F. guns, being designed only for defence against torpedo boats, are perched on the top of barbettes or otherwise exposed to the smallest projectiles.

The rangefinding apparatus occupies a very precarious position on the top of a mast. The blast of a lucky H.E. shell, striking near the eyeslits of the conning tower may kill or disable the Captain and all his assistants. Such a shell bursting anywhere except on the thickest armour, will work serious damage, cutting the muzzles off guns, bringing down masts, crushing in thinner armour at the bow or stern, letting in the sea, and making the ship unmanageable.

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Then the land gun is on an absolutely steady platform, while the ship may be rolling with the sea, rendering shooting difficult. The rangefinders on shore have instruments accurate up to 12,000 yards and a fixed base. The rangefinders on the ship have an obscure and difficult target, and, like the gunners, have an unsteady platform, and an instrument accurate only up to medium ranges. The observers on shore can see the splash of every shot, and correct their range accordingly, while those afloat may lose sight of most of their projectiles going over or falling short, and burying themselves in the earth. Thus then all the advantages should be with the shore batteries in a duel.

Still, as long as the thick armour is unpenetrated, the ship can steam and work and fight her heavy armament, and once past the batteries, might still work terrible havoc beyond. This is where most of our modern works are at a disadvantage. The old 80 ton and 100 ton M.L. and 67 ton B.L. guns, which were a match for any armour afloat in their days, are now things of the past. Few if any guns heavier than a 9·2, are now mounted in our land works. This gun, powerful though it is, is no match for even 9-inch Krupp armour except at the very shortest ranges, as ranges go now, and most foreign ships now carry two or three inches more than that. The United States ship "Wyoming," has 11—12 inches, Italian "Michael Angelo" 12, the French "Danton" 10, the German "Nassau" 11, and others building are to have even heavier protection.

To deal with these vessels, to make the risk of disablement in running past a fort too great to be lightly incurred, we must have heavier guns, guns of the most powerful nature possible, the new 13·5 inch for preference. Heavier guns than the 9·2 cannot be worked successfully by hand, so these new guns must be worked by power, hydraulic or electric. The old 80 or 100 ton R.M.L., the 67 ton B.L. also, had all power installations, hydraulic or steam, and there is no reason why this should not be applied again.

The 12-inch gun on shipboard, with its two rounds or so a minute, is now really a quick firing gun, and practically the same rate of fire is expected from the new 13·5 inch. What can be done afloat on an unstable platform like a ship, should be much more readily done ashore, and there can be no difficulty, but the expense, in mounting a few 13·5 inch guns at our main ports, with hydraulic or other power for working them. The men that can take care of the complicated Mark V. mounting of the 9·2 are perfectly competent to look after any other machinery that may be committed to their charge.

Such guns would be able to perforate any armour afloat for a long time to come, would effectually deal with any hostile vessel attempting to run past them, or by coming close in, trusting to her thick armour, to destroy shipping or buildings beyond, and leaving to the 9·2 the attack of the thin armour, or unarmoured portions.

In regard to defence against torpedo craft, the arguments used against the 9·2 may be used with equal force against the 12-pr. Q.F. gun, still the chief weapon against torpedo boat raids.

Although the speed of these craft has not risen much (if indeed it has not, on the average, decreased, with the introduction of the river class and similar boats) within the last few years, their size and seaworthiness have made vast strides, and consequently their

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radius of action, putting many places, formerly considered entirely outside the zone of torpedo attack, in positions of great danger in the event of hostilities with any naval power.

From vessels of 200 tons we have risen rapidly to 500, 600 or 900 tons, and in the case of the "Swift" to a boat of 1,800 tons with engines of 30,000 h-p.. Although still of very slender scantling, these boats have their boilers and machinery well protected by coal bunkers, and a 12-pr. is extremely unlikely to effect a vital injury. Already this has been recognized by the Naval Constructors, and the 4-inch or 4·7-inch or heavier guns are now mounted on all the latest battleships for defence against torpedo attack. The same course must be adopted ashore, the 12-pr: must follow the 1-inch Nordenfeldt, the 3-pr. and 6-pr., and be replaced by a gun certainly not lighter than the 4-inch.

The introduction of the submarine boat in place of mines is the latest and most difficult problem in coast defence. The value of these craft has never been tested in modern warfare. How they are going to manœuvre and fight against rapidly moving vessels in the narrow and often comparatively shallow waters of our estuaries and harbours, with strong tides and currents, is a question that their commanders alone can answer.

The terrible efficiency of the submarine mine we know, as it showed itself in the Russo-Japanese war, and somewhat less recklessly applied, it was a cheap and effective method of defending a port. The moral effect of the mere presence of mines was sufficient to make hostile vessels approach cautiously and deliberately, and thus give the guns a better opportunity for attack. Whether the submarine boat will prove an efficient substitute, real war alone will show. Of course the moral effect is as great, if not greater, and will prevent warships anchoring or stopping anywhere that boats are suspected to be, which will tell against the effect of their fire, while the submarine boat does not need to await the enemy's approach, but can go out to meet him. This is an addition to the powers of the defence, and will render the blockade of a port an even more hazardous and nerve-racking duty than it ever was before.

As to air-ships we can hardly say that we have much to fear from them as yet. True, they have certainly done some wonderful things, but only in the calmest and most favourable of weather, and often after days and weeks of waiting for an opportunity. The recent aviation meetings have shown again and again, that in a breeze of anything more than 10 or 15 miles an hour they became, when they dared to venture out, helpless and unmanageable. How many days a year are our British coasts free from winds of this or greater force? Besides, they are extremely delicate and liable to accident, as the ever increasing death roll in the papers only too clearly shows, and at present there seems to be little prospect of their becoming less so within the limits of weight permissible. Should they ever become more effective, guns on the lines of Krupp's anti-airship gun, will soon be introduced to deal with them, and an overhead cover of strong wire netting would greatly lessen damage to guns or detachments from any bombs likely to be dropped from above.

On the whole, then, we may say that the main lesson to be learned from the recent naval developments is the urgent necessity for heavier guns in our coast batteries. Otherwise the balance of gain and loss is not unfavourable to the defence.

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Effects on Coast Defence of the Naval Developments of the last few years.

A reply to "Rehabilitate."

By MAJOR N. E. B. BELLAIRS, R.G.A.

"REHABILITATE" has in the October number of "The Journal of the Royal Artillery," written an article under the above title, which provides ample food for thought; but I cannot allow his conclusions to pass without demur, and have selected the two following paragraphs from his article, as open to further discussion.

Para. 1

"Except for some minor details and for the more complete training of the personnel, Coast Defence has been stationary for some years past; and the naval developments, which amount almost to a revolution in the attack, have all taken place since the successive introduction of the D.R.F., the P.F., the anti-T.B. armament and the B.L. 9·2″ on the Mk. V. carriage placed the defence in its present position of excellence."

Para. 2.

"To sum up the moral to be drawn is that the defence must more than ever keep in touch with naval developments and naval methods both at home and abroad; that home and foreign naval estimates and dispositions in the near future will affect the plans of the defence more than any other factors; and that, for the present at least, the Coast Defences are in a position to do all that may be expected of them, though perhaps not all that they might wish to be able to do so."

In para. 1 we are told, that the developments in Coast Defence for some years past are in minor details, while those in the Navy are described as almost revolutionary. It would not be amiss to enumerate a few of the minor details. Readers can doubtless add largely to their number, and judge for themselves whether they are rightly classed as "minor."

They certainly are not revolutionary, but when we consider that the naval developments, as far as fire control are concerned, are likely to be nullified by the failure of the electrical communications, which are very open to attack, they certainly weigh in the balance.

These details include:—

1. Increased knowledge of the behaviour of our guns as regards

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wear, etc., owing to which, we, on shore, expect to obtain the range of our targets to within fifty yards, with our opening rounds, if we do not actually hit them.

2. *Provision of dials on mountings and elevation indicators.* The result of this is an increased rate of fire and better cover for gun layers. The rate of fire with 6″ B.L. Mk. VII. owing to this provision, has, in my opinion, been increased quite 30 per cent.

3. *Bearer loading for 9·2″ B.L.*, giving an increased rate of fire over derrick loading almost equal to that of hydraulic loading.

4. *Provision of loading trays for Light Q.F.*, which has caused an increased rate of fire with the 12-pr. of some five rounds a minute.

5. *Replacement of 12-pr. Q.F. by 4″ Q.F.* in certain situations, owing to the greater resisting powers of modern destroyers, and the more certain detonation of the modern, light high explosive shell, rendering the remaining 12-pr. Q.F. more effective.

6. *Provision of dial sights*, and the greater attention paid to training with movable armament and armament for land fronts.

The second paragraph I have selected from "Rehabilitates" article lends itself to very adverse criticism. "Dispositions" can be altered in a day, not so "Coast Defences."

Some of our "Coast Defences" are at the present moment left dangerously isolated, owing to the concentration of the majority of our ships in home waters at the recent re-distribution. Those ships left would be unable to cope with superior fleets, and would either have to concentrate or temporarily seek the shelter of the Coast Fortress guns and constitute a "Fleet in Being." The reduction of that Fortress might for this or some other reason, become a primary strategical object, which would have to be carried out.

That ships are no match for forts under modern conditions is a dangerous assumption, and at least one writer on naval subjects—Fred T. Jane—has issued many a note of warning. Perhaps it is not too much to say that a Fortress, as at present constituted, may shoot all day at a modern battleship without putting a single gun out of action, or letting in a drop of water, if firing at a range of 12,000 yards.

We must not hide from ourselves unpleasant facts, and I enumerate a few as regards our 9·2″ B.L. guns—the heaviest mounted in coast defence.

1. That uncapped projectiles only are provided, which will probably glance, unless striking armour plates at an angle of more than 40°; while capped projectiles would bite at a lesser angle. I am aware that Garrison Artillery Training lays down a striking velocity which, if not attained, renders capped projectiles of no advantage, but I do not think the question of glancing has been considered in arriving at this dictum.

2. That this angle is never likely to be greater than 60°. To compensate for this, one third of the thickness of armour should be added in considering whether the armour is within the power of the gun.

3. That Krupp cemented armour is now almost universally used in warships, and that the 9·2″ armour piercing projectiles, if uncapped, are over-matched by a 6″ Krupp cemented plate, at a range of

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5,000 yards, under these circumstances. Whereas with a 12″ gun a plate of 9 inches is well within its power.

4. With a capped projectile at 5,000 yards, the said 6″ plate would just about be matched.

Points 3 and 4 need only be considered if ships must necessarily run past these guns, as in the case of narrow estuaries, and if the said ships cannot put these guns out of action at the longer range of 12,000 yards, which it is anticipated, that if possible, they will adopt.

5. That the heavy armament of the latest foreign warships could fire and do damage during bombardment, at ranges practically impossible to ourselves, and would do so if they could afford to expend the ammunition, without risk of falling short, in view of a possible fleet action.

Other facts will present themselves to readers, but I think enough has been said to constitute an urgent plea for the replacement of some of our 9·2″ guns by others of 12″ calibre, and the substitution of capped, for uncapped A.P. projectiles, universally. Also that our land mountings for heavy guns should be modified as to allow of twice the quadrant elevation they at present provide.

What is asked for in this plea, is the minimum that should be provided, if guns mounted on shore are to deter even the modern cruiser of an enemy—from bombarding. My point is that our present armament will exercise no deterring influence on an enemy's navy—if modern—which is the "prima facie" reason for its existence.

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THE WEST POINT ACADEMY.

By COLONEL A. KEENE, D.S.O., R.A. (retd.).

IT is an article of faith among those who have received their military education at "The Shop" that the Royal Military Academy, Woolwich, is one of the finest institutions of the kind in the world. It must, therefore, have struck Sappers and Gunners alike as specially significant that, when Lord Kitchener was working out a scheme for the defence of Australia, he recommended the American Academy at West Point as a model rather than the old "Shop," where he himself had received his first lesson in soldiering.

It may then interest readers of the R.A. Journal to have put before them a slight sketch of the school which has had the high honour of being selected by our ablest military organizer as a model to be followed by our Daughter Nations in the Antipodes, for New Zealand also is to send her sons to study at the War School which the Australians are soon to start.

The first great military struggle that our colonists in Northern America had to face was the War of Independence, and it was during the stress of that war that the necessity for well trained officers was realised. The first effort to secure such officers was made in the year 1794, when young lads were appointed as cadets, and posted to the scientific branches of the army for instruction. But this half measure gave little promise of success,[1] and in 1802 Congress laid the foundations of a Military Academy, and the buildings for it were located on a plateau, amid the highlands of the Hudson River, in Orange County, New York.

The students for this school are in the first instance nominated; each Senator, the representatives of every Congressional District, and the delegates from each territory, have the power of nominating one cadet, and the President can nominate thirty. The lads are selected from all classes of the community, the only favouritism shown being in the case of the sons of army and navy officers, who usually get the preference when the President selects the cadets whom he is allowed to nominate. The lads nominated are subjected to qualifying examinations, which are held in June and in August, and there are generally about 275 cadets at the Academy at any given time.

On joining at West Point the cadet, who is usually a lad about 17 years of age, is treated as an officer of junior rank, and receives

[1] Many Territorial Officers much regret the abolition of the Mounted Infantry School at Netheravon, and say that when attached to Regular Units for training they learn but little because it is no one's particular job to teach them.

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pay at the rate of 540 dollars a year,[2] which is sufficient to cover all the expenses of his food, clothing and education.

So far all seems very easy and nice for the cadet, but, like a young bear, he has all his troubles before him. The State exacts full toll in return for its generous treatment in providing for the education of the embryo officer. The course lasts for 4 years, during which one furlough only, of 2½ months duration, is granted; this well-earned holiday is given at the beginning of the third year of study.

The cadets are organised into a battalion, which is divided into four companies, of which the first or graduating Class finds the officers, the Second Class the sergeants, the Third Class the corporals, while the cadets of the first year make up the Fourth Class or company. Class distinctions are obliterated from the moment the cadet enters the Academy, and all are obliged to mingle freely together; in spite of this, admission to West Point is eagerly sought by the young men of the best families in the United States, as the education is highly valued.

The strictest military discipline is enforced throughout the whole four years; there is a minute schedule of as many as 300 offences, and part of the punishment for each of these is "demerit marks," one to five of which are awarded for each offence in proportion to its gravity. At the beginning of each six months each cadet is credited with 100 "merit marks"; if he cancels all these by "demerit marks," he is reported as deficient in discipline and dismissed.

Not only is the cadet's conduct closely watched, but his studies are superintended with the most methodical care. The theoretical course includes the following subjects: Mathematics, French, Spanish, English, Drawing, Physics, Elementary Astronomy, Chemistry, Ordnance and Gunnery, the art of war, civil and military engineering, law—international and constitutional as well as military—history and geography. Each individual is carefully examined every day at "Recitations" and marks are duly allotted to him for his work—in addition to this examinations are held twice yearly, in January and in June.

The practical course comprises drills of all the three arms, surveying, reconnaissance, field engineering, simple astronomical observations, fencing, riding, gymnastics and swimming. Dancing is also much encouraged by the authorities, because it was noticed by a shrewd professor that the cadets who could dance were much more apt than the others to seek the society of ladies, and the object in view at West Point is to turn out gentlemen as well as officers.

The practical portion of the training goes on all the year round, but is specially attended to during the ten weeks from the middle of June to the end of August, during which period the cadets are taken into camp in the grounds near the Academy. In camp, the discipline seems to be, if possible, more exacting and severe than in the Academy buildings, and the work is incessant.

It is hardly to be wondered at that, with all this careful super-

[2] The sum of £20 (100 dollars) has to be deposited by the parents or guardians when the candidate first joins; this is enough to equip a new cadet with uniform and to supply him with all articles and books.

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vision, and the very high standard of character and education required, only about fifty per cent. of those who are admitted to West Point ever qualify for commissions in the Army; on the other hand, the education commences early and comprises so much that is useful in civil life, that the time spent at the Academy is by no means thrown away, and as the State pays, the parents suffer no pecuniary loss. But those who pass through the ordeal are thoroughly trained and competent officers, and in the study of the great Civil War in America there is nothing more striking than the results of the West Point education as exhibited in the high standard of professional skill shown by the great leaders in that colossal struggle. Between April, 1861, and April, 1865, the Federals enrolled and embodied no less than 2,656,053 men; the Southern States cannot have called less than one million to their colours; out of this colossal total of 3¾ millions there were not 20,000 Regular soldiers when the war started. In the course of four years, therefore, 3½ millions of citizen soldiers were moulded, marched and manœuvred over vast spaces, and led through some of the severest fighting the world has ever seen, and all this training and leading was directed by men who had graduated at West Point. Lee, the great organizer and strategist, "Stonewall" Jackson, the wonderful tactician and leader of men in the field, the brilliant McClellan; the stern, relentless Grant; the brave and indefatigable Sherman—these and hosts of others who earned undying fame during that awful struggle between two forces of Anglo-Saxon stock, learned their lessons of military skill, discipline and devotion to duty during their four years of unremitting study at the West Point Academy.

We see, then, that Lord Kitchener had good grounds for advising the Australian Commonwealth to take the American Military Academy as their model, and we trust that if the difficulty of getting young men to come forward for commissions in the Regular Army continues our own War Office will not lose sight of the methods of military education employed by our American cousins.

One of the reasons why there is an unfailing supply of youngsters for commissions in our own Navy is the early age at which the boy is got off the parental hands; and it is obvious that, if the Government of this country had several military colleges, at which a lad could get a useful general education, as well as a military one, and if that education was largely paid for by the State, parents would eagerly enter their sons for a military career.

Officers we must have, and to guard against the threatened failure of the supply, there seem to be only two alternatives: we must either have Military Colleges on the lines above suggested, or we must increase largely the present scale of pay for our officers. It is clear that the former method will not only be much cheaper, but that it will also give the State a certainty of securing a thoroughly well-trained officer from the start.

At the beginning of this paper it was pointed out that Lord Kitchener had passed over his old War School and given the preference to West Point as a model to be copied by our Australian cousins. But lovers of the "Shop" can lay this flattering unction to their souls; when the idea of starting a Military Academy in the

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United States was first mooted, Colonel Henry Knox, Secretary for War under George Washington, recommended that it should be founded on the lines of the military school in Woolwich.

Why is West Point better than Woolwich—"*Matre pulchra filia pulchrior*"? The main points in favour of West Point seem to be —a wider field of selection at the start, owing to the system of nomination which throws the school open to all classes of the population; secondly, the longer course of instruction which permits of greater thoroughness in teaching; thirdly, the system of "recitations" by which each individual pupil is kept up to the mark by daily examination. Last, but most significant, is the fact that with Woolwich the difficulty is to get in, while of those who get in probably 98 per cent. obtain commissions. At West Point the entrance examination is a qualifying, not a competitive one. but after entrance so severe is the competition that not more than 50 per cent. of the cadets ever secure the coveted honour of commissions in the United States army.

If the West Point system is better than our own, and Lord Kitchener's verdict seems clear on the point, then we ought to remodel Woolwich and Sandhurst. But we cannot imitate the best points of the West Point system without imitating the example of the United States and letting the State bear the expense of educating the cadets at our Military Colleges.

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A Plea for more Signallers.

By LIEUTENANT C. F. WARD, R.F.A.

1. THE pressing demand for a larger establishment of signallers in horse and field batteries is universally recognised in the reports of the past year, but a curious apathy still seems to bar the way to its fulfilment. It is unnecessary to multiply examples pointing out the importance of adequate means of communication in batteries and it will be sufficient to quote three of the most obvious cases, before proceeding to suggest a reasonable establishment, and to discuss its value.

2. It is accepted that the effect of Q.F. artillery employed with sufficient intensity at the right moment must be decisive in most cases. But the supreme qualification "employed at the right moment" depends absolutely on thorough and reliable communication from the G.O.C. Force, right down to the officer actually with the guns. Again, concentration of fire was formerly obtained by "massing guns from the earliest possible moment." Now this is rarely possible owing to the extent of modern battlefields and the consequent dispersion of batteries. But, thanks to the range of the gun, the fire of dispersed batteries can be concentrated, provided that the means of communication are adequate.

We have shown, then, the importance of adequate communication, as securing the timely employment of artillery, and concentration of fire, and it will be sufficient to emphasize its importance, as regards co-operation between artillery and other arms, by pointing out, how disastrous must be the effect of artillery ceasing fire prematurely, when the infantry have arrived within close range of the hostile position. And this is only one of the pitfalls that await troops dependent on a ragged system of communication.

3. "Too slow" is the text of many a just criticism. Now we are armed with a Q.F. gun the most decisive effect must often be from sudden and unexpected periods of intense fire. This entails the utmost speed at the guns, and as it will be necessary to engage even fleeting targets from behind cover, the utmost speed and reliability in the internal communication of the battery are required. In ordinary cases this communication will be by telephone, but experience teaches us that we must not pin our faith to the telephone, in fact "Field Artillery Training" itself demands that, "when the "telephone is the means of communication, signalling communication "should also be established." Hence the battery signaller must be prepared to work as quickly and accurately as the telephone, or else his battery will become unwieldy, because it cannot respond at once to the hand at the helm.

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Besides this, the utmost advantage must be taken of fleeting opportunities. Imagine, for example, a battery engaging a hostile battery, and the sudden appearance of the enemy's teams for a few minutes. The instantaneous transmission of a signal for a small switch and a rapid rate of fire, and the hostile batteries are crippled. But without reliable communication, the enemy's teams will not receive a single shell before they disappear.

Hence speed in addition to reliability is absolutely essential.

4. Now it is obvious that a single line of signallers cannot possibly work at the necessary speed. "Field Artillery Training" recommends the use of the double line in semaphore, and this system should be employed in all other cases of visual signalling as well. But more men and more equipment are required, if it is to be the recognised system. The double line for permanent use requires two full terminals of three first class signallers each. This means that the whole of the present establishment of battery signallers would be taken up by the "technical" communication of the battery.

5. But it is imperative that batteries should have some means of "tactical" communication also, because there are at least three other essential lines of communication to be maintained by the battery.

(1). With the headquarters of its brigade or division or with its infantry.

(2). With its own wagon line and ammunition column.

(3). With its own Colonel, who usually has to borrow a pair of signallers from each battery for his own use, as it is imperative for him to have them.

Besides these there should be a reserve of at least two signallers per battery, to allow for casualties.

6. A minimum establishment, then, for a battery may be estimated as follows:—

Duties.	Number.	Remarks.
Technical signallers.	1 Assistant Instructor and 5 signallers.	
Tactical signallers. 1	2 signallers.	At the disposal of Major for tactical communication.
Tactical signallers. 2	2 signallers.	At the disposal of the Captain for maintaining communication between the battery, wagons, and ammunition column.
Tactical signallers. 3	2 signallers.	Spare—at the disposal of the Colonel when he requires them.

Total—12.

At present many batteries have extra men trained as telephonists. This is unnecessary, because the signaller is the expert in communication of all kinds, and should be a trained telephonist. If this is so, it removes that sense of competition between the two means of communication, which leads to chaos, when occasions arise, when it is doubtful, which it is best to use. Besides this there is the obvious saving of men, and reduction of the battery commander's staff.

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7. As regards equipment, an increase corresponding to that of the establishment proposed above is necessary. The total equipment per battery would then be:—

Duties.	Equipment.	Remarks.
Technical signallers.	Helios, 4. Telescopes, 2.	Other equipment, *i.e.*, flags.
Tactical signallers. 1.	Helio, 1. Telescope, 1.	Stationery, &c., on a corresponding scale.
Tactical signallers. 2.	Nil.	
Tactical signallers. 3.	Helio, 1. Telescope, 1.	

8. The objection of "more expense" is always raised against such proposals as we have ventured to suggest. Yet a thing is only expensive, when, either more is paid for it than it is worth, or the article purchased is unnecessary. If more signallers are given to us now, we shall not pay an expensive price for them, because there is ample time to train them thoroughly, so when the test comes, there will meet it an adequate supply of the best article. But if we delay till the stern sentence of war demands the sacrifice, we shall have to supply hurriedly large numbers of inferior half-trained signallers, who will indeed be expensive.

As to the necessity of the article—we have pointed out above the importance of adequate communication, and only time and space preclude us from emphasizing the fact that "important" is hardly the word for that which is a vehement, vital, necessity.

A higher establishment would be cheap now. But if we delay, the price will indeed be heavy—the price of inferior signallers hurriedly trained, and inadequately equipped, added to the disastrous tale of opportunities lost.

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Notes on the War in the Peninsula, 1808-10.

Including the "Giron" diaries. Edited by Major J. Arzadun, Spanish Artillery.

By MAJOR GENERAL J. C. DALTON, R.A. (retd.).

(With Map).

(Continued from page 408).

PART X.

After the battle.—State of the vanquished.—Prodigious reorganization.—Renewed vigour.—The Junta in danger.—Tenacity of Wellesley.—In search of a victory.

Venegas reached his headquarters at Valdepeñas at 6 o'clock on the evening of the 13th August, 1809, after forty-eight hours of accelerated retreat, in which hunger completed the dispersion caused by defeat. Arrived there he issued an order to Giron, the stoical conciseness of which surpasses in its melancholy eloquence, the expression of profoundest grief.

The brief dispatch is headed by a cross, which well merits study by experts in graphology. The vertical stroke of the cross ends up in a vigorous crook; the horizontal is full and robust, interminably prolonged, and rising, as it were, in an upward flight of hope. If the marginal postcript, which modifies the text of the order bears evidence to the confusion of the afflicted mind, the simple serenity of the phraselogy is a testimony to the writer's decision to submit to a severe discipline incoherent ideas, and disintegrated armies, and to assemble once more in a methodical manner the plans which had been destroyed and the divisions which had been dispersed. The signature is a poem in itself; Venegas had never before traced a fuller or more energetic one; sharp deviations testify at intervals to the deep palpitations of his resolve, and an absence of any tremblings of uncertainty. The luckless general had dashed off his signature at one stroke, and so strongly that the pen had consumed all its ink before it got to the rubric,[1] which has an anæmic faded appearance.

[1] The "rubric" is the flourish with which all Spaniards terminate their signatures. Some of these are very remarkable and might well be used by experts as a means for arriving at the characteristics of the writer. Major Arzadun heads his notes on General Venegas's despatch, "De la cruz á la rubrica" from the cross to the rubric).—*J.C.D.*

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The timid pallor of his signature seems, in some subtle way, to have offended the eye of the veteran, who evidently replenished his pen and retraced the imperceptible flourish with strong black strokes. The despatch was as follows:—

"For the present and until I send you further orders, you will remain with "the division under your command in the town of Viso, where I assume you "will endeavour to re-unite all the individuals who belong to the division, and "you will duly keep me informed as you consider necessary."

"P.S. Instead of saying 'you will remain' in Viso, I should have said 'you "will proceed to Viso, where you will remain until further orders.' "

This despatch reached Giron at 7 a.m. on the day following, a short time before he arrived at Correderas; and in what a terrible state! He writes an hour later:—

"The extraordinary fatigue of the men in the marches we have been ordered "to make, in which it was impossible to keep together, and the absolute want "of food, have led to the entire dispersion of the troops, so that in the regiment "which has most, there are only 70 men at this moment, and these are so ex- "tenuated and exhausted that it is quite out of the question for them to be "able to march at present. It therefore seems advisable that they should rest "here and get some food, and then, with those we already have we may be "able to re-unite and march at dawn to-morrow to Viso. If, notwithstanding, "Your Excellency should dispose otherwise, I shall obey strictly, and shall "await here Your Excellency's decision."

"I have heard that many men have made for Montizon, and these and others "who have gone elsewhere, will come past this place where I will leave one officer "per unit to direct them to Viso, and if any should turn up at Santa Elena or "La Carolina, I hope that the officers in command at those posts will send them "on to join their division."

No reaction after defeat could have been quicker or more energetic than is evidenced by this determined effort to reorganize, on the march, the battalions which had been shattered by the terrible blow received at Almonacid. Not for a moment was the consternation caused by the defeat allowed to prevail. As happens with a wound in a healthy body where, by a flow of generous blood to the contused and rent tissues, a healing cicatrization sets in, so, round about the brave generals, the scattered troops commenced to collect and group themselves; most of them had kept their arms, which, owing to their scarcity, were doubly valuable, and had borne with resignation through the interminable retreat, the weight of the musket, (which being without cartridges was only a burden, and useless for defence), all anxious to be once more incorporated in the decimated regiment.

From La Carolina, where he had established his headquarters, Venegas wrote to Giron on August 14th:—

"In my General Order I have directed that the first division should cover the "passes of el Rey and Muradal, the second to be at Montizon, the fourth at "Despeñaperros and Collado de los Jardines; and the division under your com- "mand (the third) will encamp at Santa Elena as a reserve, and then, in order "to equalize the work, I propose to change all round according as circum- "stances shall permit."

The pursuit was not a cruel one; the French cavalry lost contact with the active Spanish infantry on the night of the battle, and they had not so far entertained any idea of forcing the rugged positions in the Sierra. Only on the 17th was news received of the approach of the enemy, as is shown by the following confidential order which

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Venegas dictated to Giron from La Carolina on August 18th, at 7 a.m.

"According to intelligence received from Viscount de Zolina, from Valdepeñas, "referring to other items from Manzanares, it would appear that the enemy "arrived in force at Villarta at noon yesterday. It is necessary therefore, to "observe special vigilance, and to so arrange that the various posts may be able "to defend themselves with the greatest tenacity.—I am sending foot-gear,[1] and "please advise if you are wanting anything else."

Meanwhile the work of reorganization was producing rapid results. In a letter, dated 19th August, the general commanding expressed his satisfaction at seeing the progress made in the reconstruction of the divisions, especially in that commanded by Giron:—

"I see with pleasure that your division is growing, for I must detach some "troops from it temporarily for the Puerto del Rey, because Lacy's division "(the first) had not, up to yesterday, collected more than 1,400 men of whom 600 "were without arms; and although an attack seems hardly probable, I feel that "the enemy may base his enterprises on what he may judge our present con- "dition to be."

Another written on August 29th shows him to be reassured and confident:—

"The division grows, and I know that some units are holding classes in tac- "tics for officers, sergeants and corporals; by following this plan, and having "daily instruction we shall repeat *la osadia* (our intrepidity), as the enemy "styles it, of seeking him in Almonacid, or wherever he may be, and beat him."

Eighteen days sufficed to completely wipe out the depressing effect of the hard lesson, a notable example of that power of recuperation possessed by the routed armies which so surprised and discouraged the French.

But this saving work of wonderful rehabilitation was being neutralized by a deep seated internal malady which was sapping the robust nature of the lacerated nation.

The Central Junta, attacked by ambitious people, and disdained by rivals, felt its prestige was being ruined by the series of disasters which had marked its line of action. It was accused of incapacity, and, no doubt, it was incapable of performing the miracles which, by ancient tradition, every Spaniard exacts and claims from his rulers.

The Junta which, being seized with the revolutionary fever, had dared anything, was now branded with a want of decision; it had embarked on a truceless war and general rising; always in a state of acute tension it was organizing the religious crusade and the terrestrial career which were to sow the national soil with warriors; congratulating as dauntless the conquered leaders if they had only shewn firmness in action, exacting from the captains-general and governors of fortresses that famous oath, to fight to the death, under the penalty of being declared traitors to the country, which infused superhuman spirit into the defenders of Zaragoza and Gerona.

The local Juntas discussed the orders of the Central Junta and neglected to comply with them, so much so that in Seville itself was hatched the plot organized by the restless Count de Montijo, the Dukes of Infantado and Osûna, Don Francisco Palafox and other

[1] *Calzado*, which means sandals or shoes, leggings &c., and possibly stockings as well.—*J.C.D.*

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members of what was, at one time, the supreme Junta of Seville; bold conspirators who even attempted to gain over the British Ambassador to their cause.

In a situation so uncertain as that one has to choose between sullenly resigning power, or reconquering it by means of a glorious triumph. The second alternative is unanimously preferred, and there is nothing more human than to imagine it possible and simple to gain a victory for the sole reason that it is indispensable. The Junta did not cease exhorting the British general to combine forces, and join in a decisive advance.

It is a fact, that so far, the national pride would not submit to having Wellesley as Commander in Chief of the combined armies; but the Junta went so far as to offer to place under him the Army of Extremadura, now reduced to 12,000 men, and under the command of the anglophile Duke of Alburquerque, whose name alone was a pledge of concord. But all in vain! The farseeing leader spied on the horizon the sign of the hurricane which, owing to the peace signed between France and Austria, was about to burst over him, and he was preparing with quiet sangfroid the famous lines of Torres Vedras. He knew the future was to be his, and that nothing should hinder him.

He had already, at Talavera, learnt from his first experience of combined action how difficult it is to reconcile the methodical efforts of a regular army with the desperate convulsions of a nation.

Rather than take refuge within the walls of a besieged fortress it is more practical to allow it to crumble under vigorous assaults; and avoid the risk to the unreflecting friend, who hurries to defend it, from being buried in its ruins. Later, when mortal fear takes possession of the moribund already in convulsions, he can without danger hasten to his assistance; when the fortress falls into ruins that will be the moment to rebuild it. Such are the prudent calculations, which success will justify, of him who knows and can wait!

The Junta had to reunite its meagre forces to take their chances without outside aid in a supreme effort. The charge of want of decision was decided for good and all; the Junta would unite the armies of Extremadura and La Mancha, trusting for their ample endowment, to the fervid appeals for remittances signed by General Alvarez Campana (preserved in the national historical archives), and supplied by the States; it superceded Venegas the unlucky by Eguía the prudent, and again superceded the latter, who declared himself resolutely opposed to the fatal advance, by Areyzaga, who would be rash from a sense of obedience, and who regarded it as a matter of duty to carry through the hazardous attack.

And thither went 55,000 soldiers, the best which in this interminable contest it was possible to assemble under the national banners, commanded by brave generals, who marched to inevitable defeat, with death before them. Thither went, yoked to Junta and army, generals and soldiers, that subdued whirlwind, whose imperceptible track history has hardly been able to trace, and in which one has so often to seek for the reason for injustice, the cause for so much that was absurd, the explanation of so much that was inexplicable; misleading and tyrannical opinion.

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PART XI.

From Venegas to Eguía.—Prudent orders.—Secrecy.—To defend Despeñaperros. — Incompatible views. — The renunciation. — Stormy session.—The pothooks of the scrutiny.

About the middle of September, 1809, the Central Junta, which was made aware through the British Ambassador of the conspiracy which was hatching against it, decided to rehabilitate its decaying prestige by entering on an audacious campaign. It knew that the British army would not go a single step in favour of its projects; and it, therefore, left in Extremadura 12,000 recruits under the orders of Alburquerque, with one single battalion of regular troops (the fourth Walloon Guards), and incorporated the best of that force into the army of La Mancha which had barely started reorganizing.

Doubtless Venegas, who was on his guard against these fresh and risky ideas, had no suspicion that he was to be superceded by Eguía, because on the 21st September he had issued orders to his divisions from headquarters at La Calzada for a general advance of the whole line.

The orders which Giron received in El Moral were as follows:—

"To-morrow you will move with your division to Daimiel, and on the 23rd to "Arenas, where you will await further orders."

Three days later, another official despatch, dated at Ciudad Real, informs us of his being replaced in command by another general, whose first measure was to replace the rash plan of campaign by a more prudent one. Employing Venegas, to gain time, Eguía lost no time in checking the advance which had commenced.

"Although as you will have learnt from my last order to the army, I have "handed over the command-in-chief to H.E. Sr. D. Francisco de Eguía, he has "requested me to communicate to you his order that you should transfer your "division to Membrilla, understanding that the first and fourth divisions go to "Manzanares, the second to Solano, the fifth to Villarrubia, and that the "cavalry will occupy, for the present, the line given up by the infantry."

Since the first official letter of the 21st September, one notes a radical change in the tone and form in which the command is exercised. The orders are detailed and exact, the instructions laying down the extent to which the divisions are to conform in each case; the object being to concentrate the endeavour and attention of all on an energetic defence of the Sierra Morena against the coming attacks. And from his headquarters at Daimiel the foreseeing Eguía prepares retrograde movements, the urgent necessity of which he conjectured:—

"Having determined to take up a fresh position with this army, the enclosed "note will inform you as to the arrangement of all the divisions in any eventu- "ality. I send you special instructions on which you will act in the event of "your having to fall back, and in them you will note the manner in which the "divisions will eventually support each other, whilst circumstances render it "necessary to hold on in the position detailed."

The following despatch, dated 4th October, 1809 (one of those

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" very confidential " documents which throw so much light on historical research) lays bare what was passing in the mind of General Eguía :—

"Very Confidential."

"The enemy is gaining considerable strength in our front, according to news "which I have just received, and although his full strength up to date is not "such as in any way to impose respect on the army under my command, the "circumstances by which we find ourselves waiting for the general plan which "is being elaborated by the government, in agreement with our allies, to take "a vigorous joint offensive, urgently exacts from us a passive line of conduct "in order to avoid the smallest risk of destroying the flattering hopes which "surround us. Therefore I have resolved that the entire army shall march in "the direction laid down in the accompanying memorandum in order to retire "into the Sierra."

As may be seen from the above, in the opinion of the General-in-Chief, the vigorous offensive which was mooted required as a necessity the collaboration of the Allied army; if, as the Junta gave him to understand, the combination of forces were realized, there would be good reason for "the flattering hopes which surround us." It was, therefore, desirable to await in a safe position the drawing up " of the general plan which is being elaborated by the Government, in agreement with our Allies." One cannot fail at once to perceive the callousness with which the Junta, which was perfectly aware of the refusal of Wellesley to add his efforts to those of the Spanish troops, deluded Eguía with false hopes which time would very soon dissipate.

The positions assigned to the eight infantry divisions were as follows :—

Valdepeñas, Villamanrique, Visillo, Santa Cruz, Argamasilla de Calatrava and El Viso, whilst the cavalry was concentrated about Valdepeñas and Santa Cruz.[1]

It was not long before alarms became more accentuated, because on the 10th October a confidential despatch announced and detailed the retreat to the Sierra; on the 13th, at midnight, the order for the march was sounded, and the well thought out movement began which has been called by the historian of one of the Seville volunteer regiments " the majestic retirement of Eguía."

A despatch dated in Santa Elena on the 15th October, indicates the points which each division had to defend in order to protect the passes of the Sierra Morena; the third was to cover the passes "del Rey" and " Muradal"; the first (Lacy's) was to remain in La Correderas, to be ready to go where required, and the seventh (Copons) was placed at Santa Elena for the same object.

Eguía writes, with true military courtesy, to Giron :—

"If you desire to address any observations to me regarding your position and "its defence, or on any other subject which conduces to the better success of "our arms at the present juncture, I shall take a special pleasure in hearing "your opinion which I shall always value from the justly high estimation in "which you are held, due to your talents and valour."

The preparations for the defence of the bulwarks of Andalusia

[1] Owing to the necessarily small scale of the map, it is not possible to show all these names on it.—Most of them will be found in Oman's "Peninsular War." —*J.C.D.*

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were zealously proceeded with, a clear proof that the divisional generals thought them most opportune.

One has only to peruse the daily reconnaissances of positions and itineraries which the Count de Clonard, second in command to Giron, scrupulously carried out with indefatigable minuteness, the schemes drawn up by D. Antonio Benavides, Colonel of Engineers, by order of his chief and the incessant labours between the 15th and 30th October, to make it readily understood that the idea of Eguía to make of Despeñaperros an Andalusian Thermopylæ, at the very moment when the British were fortifying their impregnable refuge against the foreseen invasion of Portugal, should have fulfilled all requirements.

It is hard to conjecture what would have been the result of this prudent defensive, had it been approved.

If only instead of the terrible disasters of Ocaña there had been an energetic resistance by 55,000 soldiers strongly entrenched; had Andalusia been saved as well as Portugal; had Soult been driven back at the same time on Massena, and been forced to withstand the onslaught of the allied armies, flushed by victory! But what a huge distance separated the expectant attitude of the Commander-in-Chief and the blind confidence of the Government, which went so far as actually to select the "corregidor"[1] who was to govern the re-conquered capital. . . . . !

It is quite impossible to expect to reconcile such divergent views. On the 15th October the general addressed to the Junta a letter of indignant reproaches, which gave rise to a stormy session on the 17th, the very interesting rough draft of which is preserved in the national archives. Two minutes were put to the vote with regard to the reply to be sent to General Eguía.

"*First.* That any proposition which tends to impeach the government cannot "be entertained, and that a reply should be sent in that sense. *Second.* That "General Eguía's resignation of his command be accepted and that it be con- "ferred on General Areyzaga; and that in view of the necessity for ensuring "uniformity in the army advantage should be taken of the ability and experi- "ence of General Eguía by conferring on him the post of Inspector of Infantry, "knowing that being fully competent he may be relied on to serve with honour "in the post."

The former alternative was rough in appearance, but it would save him! The second was flattering, but it would dismiss him!

The personal opinion given by a defender of the General Commanding was to this effect:—

"Campo Sagrado.—The question concerning the general plan which General "Eguía asks is a fair one: what he wants to know is the objective to which the "movements are directed 'which may be purely political'; a point of the "highest importance."

In another from Ovalle, one reads the following words, a proof of the obstinate hopes of the Junta, which would not allow itself to accept as final, the refusals of the Allies to co-operate in any way:—

"That as regards the English, it should be definitely ascertained whether they "say yes or no, and that a note should be published and printed to that effect."

On the back of the paper, yellow with age, two groups of thick

[1] Magistrate.—*J.C.D.*

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lines which resemble infantile pothooks mark the record of the voting; fourteen strokes against five indicate the selection of the second alternative which removed the prudent general who declined to force the best army Spain possessed to a sterile sacrifice, and replaced him by the brave General Areygaza, who judged it to be the imperious duty of a Commander-in-Chief, as it is with a soldier, to obey blindly, even though it should lead to disaster.

And, as one contemplates in its terrible significance, those childish scrawls on the faded sheet of paper, which sent to death and disaster 55,000 brave men, one fancies that we can see them multiplying, expanding and winding in and out, very red, like so many rivers of blood. . . . . !

PART XII.

Areyzaga, Commander-in-Chief.—Resolved to take the offensive. Signs of confusion.—Cavalry encounter.—The supreme command and passive obedience.—Prudence of Eguía.—Rash extirpation and disturbing perplexity.

Though General Areyzaga, the brave defender of the "Cerro de los Pueyos" in the battle of Alcañiz took up (according to Arteche) the command of the army on the 22nd October, one does not note any modification in the defensive operations during that month, because up to 30th October the careful reconnaissances which were directed by the Count de Clonard in front of his position of Las Ventas del Marques in the Sierra Morena, continued.

On the first of November, 1809, Giron received the following order, signed by General Alós from La Carolina:—

"His Excellency the Commander-in-Chief directs me to inform you that to-
"morrow the 2nd instant, you will proceed with the third division under your
"command to Viso, where the seventh division will join you and both divisions
"will continue their march under your command on the 3rd inst., to El Moral,
"in which town you will receive fresh orders from His Excellency. You will
"be good enough to acknowledge the receipt of this despatch and report your
"arrival at El Moral, addressing to me at Santa Cruz, where the Head-quarters
"of the Army will be established on the 3rd instant."

Another letter dated in Valdepeñas the 5th November "in the first hour of the day" informs Giron that the two divisions above named, should pass on the day following to Daimiel, and on the 7th to Puerto Lapiche y Labores. But at 10 p.m. on that very day, General Areyzaga wrote another order himself from Manzanares (without intermediary) as follows:—

"Notwithstanding that I directed you to come here to-morrow, you will
"pursue your movement to Daimiel as was originally ordered."

This counter-order has, moreover, the peculiarity of being dated on 5th October, an error of one month, which when reckoned along with the foregoing contradictions, bears evidence of confusion.

The rapid offensive march over roads deep in mud as the result of the continual rains, is well known, and points to considerable

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manœuvring power on the part of the large army concerned. In spite of this, one is bound to recognise that the composition of this army did not present that homogeneity which one could desire; there were many units composed entirely of badly trained recruits; the cavalry did not inspire confidence, and the *morale* left much to be desired.

The British Colonel, Roche, attached to the headquarters of General Areyzaga, writing to Wellington states[1]:—

> "I wish I had anything agreeable to communicate to you from the army. "The Corps which belonged to the original Army of La Mancha, are certainly in "every respect superior to those from Extremadura . . . . But nothing can "exceed the general discontent, dissatisfaction and demoralization of the mass "of the people and of the Army . . . . There is not a man of the least reflection "who, as things now stand, has a hope of success . . . ."

Though one may discount the desire of the writer to please, and the exaggerated pessimism of the views on which the English General based his abstention from the conflict, one cannot deny that the picture is exact. The generals did not believe in assuming the offensive which the Junta demanded; Areyzaga did not inspire confidence, and the troops entertained no illusions as to the result of the contest.

The advance continued until 8th November with the utmost vigour. On that day the cavalry general, Freire, by superiority of numbers forced the French cavalry leader, Milhaud, to retire from La Guardia to Ocaña, but not without considerable loss of blood.

From the following day commenced that want of decision which delayed and deviated the movements of the bold general. Was this caused by fear of finding Victor across his line of retreat? Did the disproportionate losses of his cavalry in its severe, though favourable, encounter with the French cavalry surprise him? Or, was the rain storm, which rendered a crossing of the Tagus difficult, sufficient to account for the fatal detentions on the 9th, 10th, and 11th, the subsequent march in a direction parallel to the river, the intention to cross the river by Colmenar de Oreja and Villamanrique between the 12th and the 15th, and the inexplicable return to his abandoned 'ines on the 18th?

Areyzaga says in his "justificative statement" that his scheme was to arrive without fighting at the outskirts of Madrid, to entrench himself there, and then to foment an insurrection amongst the inhabitants. He little knew the rapidity and vigour of his enemy!

His delays, like his manœuvres, only helped towards a junction of the enemy's dispersed troops. If he could have delivered one unforeseen and furious attack, and had been aided by singular good fortune, this brave, but rash, general might possibly have brought to a successful issue the adventure on which he had embarked.

One might reasonably imagine that the daring obligations which he had entered into from a possibly exaggerated sense of obedience may have appeared to him both impracticable and absurd. If such were the case, we have our own private opinion as to what induced so exaggerated and pernicious a view of the sacred obligations of the obedience which the general felt that he owed to his superiors.

[1] Vide Oman's "Peninsular War," Vol. III., p. 85.—*J.C.D.*

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Inexorable discipline demands the sacrifice of all personal initiative on the altar of the will of the supreme head from all those who assemble under a flag, and who are worthy of the name of soldiers; but it should, in our poor opinion, be understood that all fruitful initiative sacrificed through military self denial, should become concentrated in him, and serve to strengthen his will and render it irresistible.

To his eminent personality, which was, so to speak, an aggregation of so many eclipsed personalities, the difficult problem of war could hardly appear merely as an act of simple obedience; he could, and his duty was to enquire into and discuss the subject; he was the one voice of the dumb host, and regarding it, as a patriot and ruler, from the political aspect, he dare not fruitlessly sacrifice the life of those he commanded, and the honour of those who trusted in him.

For these reasons, the action of Eguía, which we purposely described in Part XI., and his noble renunciation of the most attractive command which a Spanish general could dream of falling to himself, viz., that of the army, the hope and pride of his country, sooner than bend to endorse a plan which must lead to an irreparable catastrophe, deserves something better than the disdainful comment which historians unite in meting out to it.

His action at a time when the national anxiety was so strongly *en évidence*, may be ascribed to an exaggerated adherence to the routine and formality of a soldier imbued with old fashioned punctilio, and incapable of accommodating himself to the innovations and boldness which peremptory cases of urgency demand.

But when the frightful disaster, a month later, afforded so tragic a confirmation of his prudent predictions, one has no right to forget them, or to contemptuously deny to the leader any credit for his energetic firmness or the praise which his disregarded advice merited.

Being doubtful as to his real feelings, we prefer to assume that Areyzaga believed in a possible triumph for his army though it might be difficult. Accustomed to obey without demur, he heard from the lips of the perplexed members of the Central Junta that the safety of the country exacted a victory. . . . . And they believed it to their undoing. They dangled before him, with illusory and courteous eloquence, the glorious vision of freeing Madrid, and in terms of warm praise, naturally pleasing to his ears, of the brave divisions under his command, so superior to all those who had preceded them, depicted as possible the alluring venture, with the result that he threw himself into the enterprise without either properly weighing the great difficulties involved, or having even the smallest perception as to what would be the decisive consequences of a defeat.

Possibly, as happens sometimes to those who irresponsibly and impetuously embark on enterprises which their better judgment condemns, Areyzaga exhausted his brave resolution, which failed him when serious problems and dangers daily confronted him.

He saw plainly how the complex problem he had to face, grew with terrible rapidity, whilst at the same time he felt that he was steadily losing confidence in himself, and no longer could rely on

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fertility of genius to cope with that power of production of fresh combinations and resources which are characteristic of the true fighter whom difficulties never dismay.

Future leaders may derive a useful lesson by studying Areyzaga's attitude on the eve of the memorable battle, with which our concluding articles will deal; those who analyze feelings and share the pangs, which, from their being so human, attract and move us, cannot fail to take the liveliest interest in the state of mind of the unfortunate general who endeavoured in his orders to conceal his perplexity in the guise of bold resolution. As a soldier he offered his blood in the dangers of battle, whilst as general, overcome by the weight of his superhuman mission and morally vanquished, he witnessed the disaster as an agonized nightmare from the historic belfry of Ocaña, where he voluntarily effaced and secluded himself.

PART XIII.

The eve of the battle.—To the succour of the cavalry.—Who commands here?—The pillage.—The papers of General Paris.—From Bernuy to Giron.—Confidential information.

At nightfall on the 18th November, 1809, the vanguard of Areyzaga's army, consisting of the second, third and seventh divisions arrived at Ocaña from Villanueva de la Zarza under command of General Zayas. The troops had gone through a fatiguing day which had been made doubly so owing to their having through panic to retrace their steps in an inexplicable movement which savoured of the nature of a retreat.

They had neither orders nor news. According to verbal indications on the part of the General Commanding to Giron, the idea was to defend the line of the Tagus in the hope of co-operation by other armies, amongst them the English army of Extremadura. The phantasm of British protection reappeared. There could not have been greater ignorance of the situation and resources of the Spanish cause. The intelligence which the Spanish army possessed as to the position of the enemy was so vague and inaccurate that Giron gave his servant orders to buy provisions in Aranjuez, convinced that the Royal borough was in the possession of the Spanish.

They were not long left in doubt. Giron had just arrived at his quarters as evening was closing in, when the news of a cavalry fight hard by, in which one Spanish division had been forced to give way and to retire hurriedly in disorder and with loss, necessitated all the divisions getting under arms at once. Giron rapidly formed up his division, left the town, returned with a body of cavalry stragglers, and with the inhabitants who, crazy with fear, were flying across the fields.

It was sufficient for the vanguard to detach a force to cause the enemy's pursuit to cease, and they retired by the Ontigola road to-

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wards Aranjuez; but the Spanish divisions kept their ranks in case this preliminary affair should be the prelude to an immediate attack.

We have here proof of the grave inconvenience of a march of several divisions, not near enough to the Commander-in-Chief to be able to receive his orders on any special occasion, nor far enough away to permit of the command being delegated to another.

The troops were formed up in the outskirts of the town (Ocaña) in close column by battalions with the guns in the intervals. As is well known, they were deficient of cavalry except that with the vanguard which possessed a small force of that arm.

The infantry accepted the sudden surprise with the sangfroid of veterans. They were forbidden to enter the town, the outlets of which were guarded by Giron.

Night fell on the division, still in formation, without anybody assuming any authority. Giron who received a message from Zayas, inviting him to come to his quarters, replied that he could not leave his command, and there must have arisen to his lips the question natural to a soldier, "Who commands here"?

Soon after this General Jácome, who was formed up on his right, asked for orders from Giron, who in reply informed Jácome of what he himself was doing, but added that he did not feel himself justified in making any dispositions.

At this juncture General Bernuy appeared; he was in command of the defeated cavalry and, as Major General, senior to Giron. Desirous of arriving at a solution of so abnormal a state of affairs, he proposed a meeting of all the divisional generals in General Zayas' quarters. The troops meanwhile remained in formation, silent witnesses of the indecision and uneasiness of their chiefs.

When traversing the town, Giron and Bernuy witnessed a distressing sight. All the inhabitants had abandoned their houses. Cordoba, Uclés, Rioseco, and many other names, bloody examples of the fury of the conquerors who avenged themselves on the unarmed inhabitants of the places in the neighbourhood of the battlefields, explained the sad exodus. By the dumb mouths of the deserted houses, the people confessed to the army their bitter conviction that the next day would be fatal for it.

At intervals the silence of death was broken by the tumult of disorder, still more grievous than the former. The soldiers whom the defeat had left without leaders, gave themselves up with cynical pleasure to the pillage of the abandoned dwellings.

To the terror of the fugitive succeeded the violence due to indiscipline; the shivering fit gave place to the raging fever. Doors were burst open, the depredators like a swarm of ants invaded all the abandoned premises first in search of food to allay their hunger, and when that was satiated, their thoughts turned to plunder in any form.

The generals' first care was of necessity directed towards checking this mad pillage, but first of all they had a grave matter to deal with. A brave corporal from Pavia had slain the French General Paris in single combat; understanding the importance of his act, he did not hesitate to possess himself as trophies of the coat and

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weapons of his foe; with these proofs of his prowess he came to place in the hands of his chiefs papers of great value. The Generals assembled in Zayas' house eagerly examined them. They contained detailed and precise orders. A battle was imminent and inevitable. Where was the Commander-in-Chief? Why did he remain in Dos Barrios, a league from his divisions, who were marching to concentrate in that badly selected place if it was to be, as it so appeared, a battlefield open to the manœuvring activity of the French?

It was necessary to fill his place in his absence. Amongst the Generals present D. Juan Bernuy was the senior; he assumed command, and despatched to Areyzaga, with the account of the action in which his troops had been engaged, the papers found on the body of the French general. He also endeavoured to check the pillage of Ocaña; sent parties to collect the wounded on the nearest piece of level ground, and consulted with the other generals as to dispositions for the next battle.

An aide-de-camp appeared to announce the arrival of Spanish forces which turned out to be the main body of the cavalry, whose leader, D. Manuel Freire shortly joined the conference where opinions and news were hastily discussed. On hearing that Major General Bernuy was named for the command, in the absence of Areyzaga, Freire protested, pointing out the objections to such a resolution; Bernuy though the senior of those present, was serving without letters of service and by order of Areyzaga. This unexpected objection was unanimously allowed, and the command, by no means one to be coveted, fell by general consent to Giron.

It was an ephemeral command, the immense responsibility of which could at any time be ended by the sudden arrival of Areyzaga who might gallop over the short distance separating him from his forsaken divisions.

It was a quarter to eleven o'clock. A person in the confidence of the Commander-in-Chief asked leave to speak to the generals. He then gave them ample proof of the fact that the main body of the enemy was in Aranjuez and was bent on attacking. Just as Giron was arranging for this person to procure a horse and to hurry at once to inform General Areyzaga of what was happening, the officers commanding the parties which had been told off to collect those who had been wounded in the recent combat, announced that they had been forced to retire by large bodies of the enemy.

Armed with so many proofs of the proximity of the enemy and imminence of a battle, Giron hastened to address the following letter to his chief:—

"The confidential messenger Rivera, who bears this letter to Your Excellency, "brings the news that the enemy is now concentrated in Aranjuez: this intelli- "gence added to that found in the papers taken from General Paris, and in "conjunction with the fact that our bearer parties have been driven in from "the field of battle where they were collecting wounded, induce in me the belief "that we shall be attacked to-morrow morning at daybreak; and I so inform "Your Excellency in order that you may issue such orders as you may think "necessary and with the brevity which the circumstances demand. 18 November, "11 p.m.

"P.S. As I only arrived practically at night I am unaware of the position "in which I now am."

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One can read between the lines, the respectful and fervent demand of the general who, forced by duty and subordination into a contest which was, in his opinion, absurd, found himself suddenly invested with this crushing responsibility, and begged his supreme chief to relieve him of it and remove the bitter cup from his lips. He was ready to disregard his doleful conviction, and to be the most energetic of subordinates, but firmly declined to take the reins which the hesitating hands of his chief sought to drop into his, and repelled the attempt to impose on him the precarious command. But the die was already cast, and the unhappy army was to be hurled by so giddy a descent into an abyss whence no human efforts could extract it.

PART XIV.

Areyzaga's command.—Three distinct orders in one official letter.—Voluntary blindness.—Exertions of the Generals.—Preliminary signs of the battle.—Dawn.—Whither bound?—Far from the ranks, far from the reality.

Before the confidential emissary, Rivas, had got started for the purpose of making known to the Commander-in-Chief the position of the enemy, a messenger from Areyzaga arrived and placed in the hands of Giron, in the presence of the generals who, at the instance of General Zayas were sitting in conference, a memorable despatch, so extraordinary and strange, that it of itself serves to explain all the lamentable defects which paved the way for the tremendous disaster which was impending. The faint, illegible and tremulous signature bears evidence of indecision and anxiety. There is a blur on the first syllable of his name; throughout the letter, decided and almost arrogant in tone, one can trace weakness and depression.

Although the despatch was known to, and partly quoted by the historian Arteche, we cannot resist the temptation to reproduce it in full:—

"To Major General D. Josef de Zayas, commanding the Infantry of the "vanguard, I make known as follows:—

"To-morrow the 19th at dawn you will march with your vanguard and the "second division of infantry on Aranjuez, which movement has to be executed "with energetic rapidity, understanding that you will be aided with the remain- "ing infantry which is in that town (Ocaña), and you will order Major General "D. Pedro Augustin Giron to take up such a position between Ocaña and "Aranjuez as he may consider advisable, and General D. Manuel Freire will "support him with his cavalry to whom you will give the necessary orders, the "idea being that you will reconnoitre the bridge of Barcas, the strength of the "enemy in the immediate neighbourhood, and attend to all that is necessary; "this done you will advise me as to what you have seen, and remain in the "positions you have occupied until I send further orders."

"I communicate the above to you for your information and action so far as "it concerns you, and should the sixth division not have arrived at Ocaña, you "will inform its commander by my order that he should advance as well as "you, and that you should, when he arrives, act in agreement with him should "he be senior, and if it be necessary I will come myself to command the whole "force."

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On the margin of the despatch are two postcripts:—

1st. "Since writing the above I have been informed that the enemy has "20,000 men in Aranjuez, and although deserters assert the contrary, it is "necessary that the operation be carried out with the greatest care and pre- "cautions.—The first and fourth divisions will also take part and will form the "first line before Ocaña, and you with the rest of the force will be in rear of "that town."

2nd. "Notwithstanding what I have told you in the first postscript, the first "line in front of Ocaña will be formed of the first division and of your com- "mand, and the rest of the force will be in a second line in rear.

Giron feeling certain that the news he was just sending to Areyzaga would modify his plans, he added to his first letter as follows:—

"I have just received Your Excellency's despatch dated 8 p.m., yesterday, with "a copy of the order you have sent to Major General D. Josef de Zayas, and "as the news which your confidential messenger Rivas is just about to proceed "with, directly we can find him a horse, will inform you that all the enemy's "force is in Aranjuez, I am of opinion that this latest information may make it "necessary for Your Excellency to decide afresh, and as there is sufficient time "I will await your decision."

"The General commanding the vanguard, has quite recently informed me that "the enemy has his advanced bodies overlooking ours on the Aranjuez road, "which is a fresh indication that he means to attack. 18th November—11.30 "p.m."

What must have been his painful surprise to find that the original venture was to hold good, and that the vague hopeless orders were duplicated which were to send them to certain defeat in complete ignorance of their chief's intentions!

"Having received your despatches, and being also convinced that the enemy "will attack us to-morrow, I have decided to forestall him and to attack. "Therefore the vanguard division, the second and that under your command "will take up a position before dawn on the heights which, after conferring "last night, the three commanders considered as most suitable for charging the "enemy with effect, and if possible halfway up the said heights which are "better known to you than to me; and you will understand that I shall be in "the second line with the remaining troops for the purpose of reinforcing you "when necessary. If the first division under Brigadier Lacy should arrive in "time, it will go instead of the second, which in that case will remain in reserve. "I am sending a duplicate of this order to General Zayas . . . . Head-quarters at "Dos Barrios. 18 Nov. 1809."

Again there is a postcript which this time is in the handwriting of the general commanding, to the following effect:—

"It is necessary that our attack should be a determined one in order to "frustrate the enemy's uniting, because there is no doubt that he tried to do "that in Santa Cruz, attacking us in front and rear; for this reason you should "be on the hither side of Aranjuez, otherwise you would only give him time "to unite his forces."

The above orders for a determined attack on an enemy superior in strength, and in positions unknown to the attackers, the discovering of which was to be entrusted to a meeting of generals overwhelmed with the conviction of inevitable defeat, were intended to be encouraging, but were the reverse; despair can be plainly discerned under the mask of boldness.

Without hardly knowing whether the first, fourth and sixth divisions would arrive in time to reinforce the 18,000 men assembled there; without at least fulfilling his promise to arrange for the co-operation of the cavalry in an advance, which if it has to partake of the nature of a surprise is the one arm whose duty it is to begin it,

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Areyzaga aimed at attacking the French with a decision more puerile than heroic.

And his acts were not the result of ignorance. He had already heard from his best confidant, Esquerro, as to the numbers of the enemy, and the certainty of victory felt by the latter. It was a case of voluntary blindness in one who shuts his eyes in order not to look the danger in the face.

When at a very advanced hour during the night the generals received the definite orders above mentioned, they attempted loyally to carry them out. The few brief hours which they had yet before them 'ere dawn set in were employed in adopting dispositions for the approaching day. As the only officer acquainted with the ground belonged to one of the absent divisions, they succeeded, after painful exertions, in finding two inhabitants of the abandoned town who described to them, after their own manner, the conditions of the neighbouring camp. At 3.30 a.m. Giron who felt convinced that his chief was resolved not to come until the battle began, answered his last despatch with these words:—

"I have received Your Excellency's despatch, and have noted what Your "Excellency is good enough to inform me therein, and in accordance with your "instructions we shall take up the positions which Your Excellency desires "after 5 a.m., up to which time the troops will be resting, and we shall await "there your final orders. If the enemy should appear, I shall for my part "follow Your Excellency's instructions. The commanders of the three divisions "are now going to discuss how we are going to locate ourselves, with the "assistance of people who know the ground of which I for my part am in "absolute ignorance."

"Half an hour since, an advanced sentry of the vanguard challenged some "carts which were coming along the high road which the commander believed "to be artillery, and not receiving any reply opened fire on them; I cannot "think they were guns, for it is hardly likely the enemy would send them alone "in this manner."

"Nothing fresh has occurred; the wounded from yesterday afternoon's fight "between our cavalry and the enemy have been withdrawn from the field. "Ocaña, 19 November, 3.30 a.m."

A little before 5 a.m., trumpets and drums aroused the soldiers, many of whom were to see their last day dawn. Whilst taking some food and preparing to march against the enemy, Giron despatched to Areyzaga the following laconic note:—

"At this moment, 5.30 a.m., we are taking up our positions on the same "road as the enemy may himself advance by; if he appears, we shall act as "Your excellency desires . . . ."

On arriving at this point Zayas demanded that an omission should be pointed out; notwithstanding the promise of the General-in-Chief, Freire had never received orders for his independent body of cavalry to take part in the rash advance; and in order that Areyzaga should know of this fact, they added to the above note these words:—

"but it is my duty to bring to the notice of Your Excellency that General Freire "is not co-operating in our movement because he has not received orders to "do so."

The day had not yet dawned, and when Giron begged the general commanding the vanguard to begin the march, the latter "considered it unwise to leave before dawn, being, as we are, in "absolute ignorance of the ground we are on, and with the proba-"bility that the action will begin directly the head of the column

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" leaves Ocaña." This opinion was generally endorsed by all, including Freire and Giron.

The state of mind of those generals, committed to an unequal contest, on unknown ground, without any concrete plan, and deprived of the presence of the Commander-in-Chief; the absurdity of that march of four divisions against the numerous enemy already in contact with the Spanish advanced posts, is reflected in this pathetic note to Giron:—

> "At the moment of departing, one of the Generals (whom I believe to have "been Freire though I am not certain) said to me 'But where are you going'? "I answered 'I don't know, I only know that I have been ordered to go for the "enemy and I am going.'

A battle which commences under such auspices is lost without remission.

To attempt to analyse the movements and manœuvres which decided the rout would be futile. The orders for the advance we have given above sentenced the best army Spain possessed to an inevitable catastrophe. But that voice which persisted, in order to appear energetic, in shouting " forward " was the echo of others which in the memorable session of the Central Junta of 17th October, replaced Eguía the prudent by the good Areyzaga, always ready to obey as a soldier, even so far as the absurd orders to reconquer Madrid.

In that mad resolve of 17th October, were recorded and epitomized endless errors and misfortunes. There remain still to be added to them another tremendous and prominent source of disaster, namely, the interminable series of battles which have been lost by people who were not present at them; hidden directors, a hundred leagues away from the troops and from the reality; Councils formed in court or party circles; unrepresentative Juntas, or politicians for effect!

CONCLUSION.

This concludes the present series of the Giron diaries, but it may be interesting to our readers to refer very briefly to the part played by General Giron in the year following:—

After the defeat suffered in the early days of 1810 in the lines of Sierra Morena, General Giron hastened to offer his services to the Regency, then transferred to Cadiz, which had become the ultimate stronghold of Spanish independence.

About the middle of 1811 Giron was appointed Chief of the Staff to General Castaños, his old chief and kinsman, and he commanded the Spanish force which defeated the French at Arroyo-Molinos. He took a leading part in the reorganization of the Spanish troops, and at his suggestion the number of separate armies was reduced, by which means the fourth army, under the command

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of Castaños, was able to detach a large contingent which took part in the victories of the year 1813 which drove the French from Portugal, and found them pursued across the Bidasoa after their decisive defeat at Vitoria.

After the war Giron, now a Lieut. General, tailed to obtain employment suitable to his rank owing to his well-known liberal views. The revolutionists of the year 1820 selected him for the post of Minister of War, but Giron did not choose to submit to the requirements of the party in power, and soon resigned his portfolio.

The Royalist reaction of 1823 forced Giron to remain out in the cold in his native land, but when Ferdinand VII, in the last year of his life, entrusted to the liberal party the defence of the throne of his daughter Isabella, General Giron was made Captain General of Andalusia and nominated as a member of the Council which was to assist Queen Cristina in the office of Regent of the Kingdom. He was President of the Senate and Minister of War.

His concluding years were passed in peace and given up largely to study to which he was always devoted. His death, which was sincerely mourned, took place on the 17th of May, 1842.

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The Events in Alsace—4-6 August, 1870.

(A Lecture delivered at the Royal Artillery Institution on Thursday, 15th December, 1910).[1]

By CAPTAIN A. F. BECKE, late R.F.A.

Major General H. E. Belfield, C.B., D.S.O., in the Chair.

"IN WAR, OPPORTUNITIES WILL NOT WAIT."—*Thucydides.*

INTRODUCTORY NOTE.—The works relied on for this lecture are:—

"Franco-German War, 1870-71." German official account, part I., sections 1-3, and the Atlas.

French official account.—"La Guerre de 1870-71," parts I., II., and VII., and the Atlas.

"Frœschwiller," by General H. Bonnal, and the Atlas.

Colonel A. Grouard's numerous Studies and Critiques of the strategy of 1870, and also of the Napoleonic Strategy have been most useful.

For the handling of the two cavalries at Wörth I have also used "Cavalry, its Past and Future," by Colonel F. N. Maude, C.B., late R.E.

THE CHAIRMAN: Ladies and gentlemen, I have much pleasure in introducing Captain A. F. Becke, who has come here this evening to give us a lecture on The Events in Alsace—4th-6th August, 1870.

THE LECTURER: General Belfield, ladies and gentlemen; I fully realise the difficult nature of the task with which I am entrusted—to compress a great deal of history, and some comments, into a very short space of time. I will waste no time in preliminaries, but at once commence on the subject of my lecture, which deals with the events in Alsace between August 4-6 (inclusive).

So that the special period may be appreciated, it is necessary to glance briefly at the opening events of the Franco German War. After the war of 1866, in which Prussia had crushed Austria in a short seven weeks, France reposed in a false sense of security, utterly failing to appreciate the serious and menacing nature of a conflict that she took no steps to avoid, nor even to prepare for. But Prussia had taken to heart the lessons she had learned in 1864 and 1866; and thus in 1870 she had merely to perfect existing arrangements; whilst France, on the other hand (as events proved), had to create everything, although the French War Minister had expressed the opinion that the Army was in a state of complete preparedness.

[1] The lecture was illustrated by lantern slides; but, to enable officers to follow it, maps showing the principal movements are reproduced. The authorities for the maps are given in Appendix I.

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Bismarck most skilfully forced matters to a crisis in 1870; and, by July 15, withdrawal by either side, from an immediate rupture, became virtually impossible, and war had become practically inevitable; so much so, that the German mobilization was ordered to commence on July 17; but, with great skill the rôle of aggressor was forced on France, and she finally declared war on July 19.[1] The actual rupture was abrupt and sudden; and this is proved by the fact that our Foreign Secretary had not long before declared that he could not discern "a cloud in the sky." Nevertheless in a few short weeks two nations were about to engage in a struggle in which both armies would be armed with breech-loaders for the first time in history.

France determined to take the offensive, so as to secure, if possible, the separation and secession of the South German States. To make the most of the three railways she possessed, and which ran towards her eastern frontier, the French army was assembled in two great groups about Metz and Strassburg, whilst a reserve was collected at the Camp of Châlons. Thus the French assembled practically on the line of the Saar, and not on that of the Moselle. But v. Moltke, who had foreseen everything that human insight could foresee, declined to have his hand forced, and refused to hazard small bodies of troops to cover the rich provinces on the Rhine's western bank. To do so would be to risk an unsuccessful "first-blood"; and the iron Chief of the Staff knew well how much easier and more satisfactory it is to progress from success to success. He rightly refused, therefore, to allow public opinion, or mere sentiment, to dictate his strategy and he correctly preferred to temporarily lay open some of Prussia's territory, rather than make a premature attempt to hold it. Using the nine available German railways v. Moltke arranged, therefore, to detrain on the Rhine, instead of on the Saar.[2]

In the meanwhile the French Emperor, Napoleon III, reached Metz on the evening of July 28th. But now, just when a decisive stroke should have been delivered, and a telling entry made into the arena of war, the French offensive came to an ominous standstill on the frontier itself, collapsed, and then died away altogether. The situation on July 31st, when examined, clearly shows the undeniable chance that was offered to the French leaders.[3] On that day the German Ist Army was dispersed between Saarbrücken-Trier and Neunkirchen; the IInd Army had just reached the Kaiserslauten defile,

[1] This point is most interesting; and 1870 is almost the classic example of a declaration of war being made prior to the opening of hostilities. Russia behaved very differently in 1877, and so did Japan in 1904. Sir F. Maurice in his work on "Hostilities without the Declaration of War," proves that between 1700 and 1870 there were 107 cases of sudden aggression, before any formal declaration of war; and no fewer than 60 of them took place between 1800 and 1870.

[2] The German railways undoubtedly performed yeoman service in 1870. By August 9 they had handled over 450,000 men, some 130,000 horses, and 14,000 guns or vehicles. During the war they transported to the front nearly 300,000 reinforcements and some 20,000 further horses. Further they evacuated about 250,000 casualties and nearly 400,000 French prisoners, who thus eventually effected their concentration in the German prisons. The German railways in 1870 may well be looked on as the arteries of their armies.

The much abused French railways also achieved a very creditable performance. By August 4 they had moved to the front no less than 300,000 men and over 60,000 horses, together with 1,100 guns and wagons; and this was achieved despite the general confusion that reigned everywhere.

[3] Vide map 1.

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and was distributed over a large area of ground stretching back to the Rhine both at Bingen and at Mannheim. The IIIrd Army was even less in a position to take any hand in immediate operations, for it lay between Speyer–Landau and Karlsruhe. On the other hand, Napoleon III's forces lay in two masses; the northern one being in Lorraine between Forbach–St. Avold–Metz and Bouzonville; whilst the Southern was in Alsace and lay around and to the north of Strassburg. The connecting link between the forces in Lorraine and in Alsace, was undoubtedly the 5th Corps, which was between Saarguemines and Bitsche. Further, one of these Armies, and that the most important, lay under the Emperor's hand. The French Army too possessed all the requisite essentials for waging war. They were in possession of distinguishing marks, rifles, guns, horses, ample ammunition, and means for transporting and carrying the latter. Certainly they lacked some commodities and comforts; however neither, as Napoleon taught, are necessary for war. But Napoleon III was far from realising the potential powers of even an ill-equipped force, when led by a real leader of men; and whilst waiting for the commodities he let his chance to strike a smashing blow slip by. There is no doubt that if he had led forward his Army, on July 31st, and demanded an immediate battle from the German Ist Army, that battle could hardly have been declined; nor could the issue have been in doubt for a moment; for the Ist Army unsupported must have been overwhelmed by sheer weight of numbers. Nor could the IInd Army have arrived in time, or in sufficient strength, to succour the Ist Army. The victorious French Army would then have swung eastwards at once and crashed into the IInd Army whilst still entangled in the passage of the Kaiserslautern defile; once more success must have attended its efforts. In this case the IIIrd Army would never have come into action.

Thus we see that, unless v. Moltke had absolutely summed up the French leaders, the Prussian entry into the campaign was not sound in conception; further, it was desperately slow. Napoleon would have had no difficulty in settling the Ist and IInd Armies; and long before the IIIrd Army could have crossed the Vosges the other two would have disappeared. The main reason why this great chance was neglected must be sought in the military atmosphere by which the French leaders of the period were surrounded. They had assimilated the teachings of that school of fortress strategy which invariably relies on those false refuges for timid generals—strong, unassailable positions, garnished with very superior weapons. None of the French leaders in 1870 (brave and experienced though they were) possessed sufficient character to break loose from the heavy shackles of convention, or sufficient powers of mind to see that the doctrine they were taught was both pernicious and dangerous. The arm of the French infantry—the Chassepôt—the deadliest weapon that the modern battlefield has seen, added greatly to the usual stereotyped arguments. The doctrine was both vicious and unsound. It neglected Napoleon's teaching, and his practice of the art of war; and it also neglected the characteristic of the French soldiers. For we know that it is almost a proverb—" French more than men in attack"; and once flushed with success their following masses, with

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Chassepôts in their hands, and their guns able to make the most of their very imperfect time-shrapnel,[1] would have been hard indeed to stop. Again, as the French were inferior in numbers, they could only hope to make up for their deficiency by superiority in fighting power, in leadership, and in mobility—certainly not by wholesale immobility, coupled with a purely passive defence. To carry out such an operation necessitated that the French Commander-in-Chief should have the undoubted gifts of a Napoleon—the consummate genius to foresee what the enemy would do, the imagination to plan the decisive stroke, and the iron resolution to carry through the plan, despite all the minor accidents that must attend on execution; and thus triumph by bearing down all obstacles by sheer will power. Coupled with these mental powers there must also be great physical powers to ensure that the body would stand the stress of waging offensive war, and never weary, even at the end of the longest and most trying day. It was such a general that France required, to enable her armies to take advantage of the chance that offered itself on July 31; but Napoleon III possessed neither Napoleon's physical nor mental attributes; neither Napoleon's marvellous health, nor his iron frame; nor did he possess Napoleon's energy, nor his driving power, nor his real genius for war; and the chance was allowed to slip by. Fortune is chary of repeating her rejected offers; and it is always wise to make the most at once of any opening which she vouchsafes to offer because she is a woman, and may not be found so complaisant on the morrow, for "in war, opportunities will not wait.[2]" If history teaches us anything it is that energy in the conduct of operations most surely leads to success, and Napoleon said that a general who allows himself to be attacked is already half-beaten. These two lessons stand out quite clearly in the history of war, and a failure to recognize them must be fatal. In reality the French plan for operating in Lorraine and Alsace appears chiefly to have consisted in doing nothing—it thus achieved nothing; and failed as dismally in France in 1870, as it did with Benedek in Bohemia in 1866. By failing to profit from their opening chance the French definitely lost the initiative, were soon enveloped in uncertainty as to their enemy's movements, and allowed the Germans to become at one and the same time both the invaders, and also the dictators of the plan of campaign. Being thrown on to the defensive it was not long before the French in 1870 realised the truth of Napoleon's remark, that the change from a defensive to an offensive attitude, so lightly spoken of by the school of fortress strategy, is in reality the most difficult and delicate of all warlike operations.

Meanwhile all that v. Moltke required was time, to carry through his risky initial moves, and concentrate in two main masses so as to deal with the French Armies in Lorraine and in Alsace. For he correctly assumed that he could best cover the nudity of Southern Germany by beating back the French Armies, and not by making profitless detachments.

By August 2nd the critical time for the German armies was

[1] The time fuze could only be set to two ranges—approximately 1600 yards and 3,200 yards—thus it was essential to attack, in order that the guns might unlimber at these ranges from their targets.

[2] Thucydides.

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practically over. However on this day the French 2nd Corps carried out a reconnaissance in force against the weak German detachment which held Saarbrücken, and was commanded by Count Gneisenau[1]; but the information gained was meagre, and the operation may be considered a failure; for no attempt was even made to clear up the situation by pushing cavalry patrols over the Saar. The operation may be most fitly likened to stage thunder, but not to anything of a more serious description. The astonishing thing is that, as Napoleon IIIrd had now apparently abandoned an offensive campaign, he did not at once concentrate his very dispersed forces in such a central position that he could bring them into action as an united mass, either on his left, or on his right, as circumstances developed, and the main line of German advance became obvious.[2] The Germans were, however, not inactive, they were doing all that lay in their power to readjust, both the unfavourable shape of their frontier, and also the dangerous dispersion of their forces at the outset. Von Moltke, most wisely, realised that safety lay in boldly assuming the offensive with every available man. Further that the French, to make the most of their railways, would probably concentrate in two masses, one in Lorraine and the other in Alsace. Von Moltke decided, therefore, to move two Armies (the Ist and IInd) against the French in Lorraine; and the remaining Army (the IIIrd) against the enemy in Alsace.[3] This plan would cover Southern Germany, and v. Moltke wished to engage his forces simultaneously in the first great battle, which he would do all in his power to bring on at the earliest possible moment. To ensure encountering the French he took Paris as the general direction for his advance; for such an advance would threaten France in its most vital point, and force the French Armies to come forward and cover their capital. Thus the general direction of the Prussian advance was to be Paris; but the objective was the enemy's main army whenever it was located and wherever it might be. The detailed plan of operations naturally went no further than the first collision with the enemy's main force; because it was impossible for v. Moltke to sketch it out further with any safety. The material and moral consequences of a big battle cannot be foreseen with any great accuracy, and thus it must form a fresh starting point for new measures; although the main object of the campaign is always kept before the Commander-in-Chief's mind, yet he shows

[1] The troops available at Saarbrücken, on August 2, never consisted of more than some 3,000 rifles, 450 horse, and 1 battery. Against them were employed 25,000 men and 90 guns. As Colonel Henderson, in the "Battle of Spicheren," pp. 48-49, points out, "the engagement affords a most instructive example of a rearguard action, and of a well conducted retreat before superior numbers."

[2] It is possible that supply and forage difficulties influenced the Emperor Napoleon III., and induced him to run the great risk of keeping his forces dispersed at the critical time.

My authority are the MSS. Notes taken down by a Cadet (now Colonel C. L. Young, late R.E.), whilst at the R.M.A. in the 2nd Term, 1871; and made during Major (now General Sir H.) Brackenbury's lectures on 1870. In the notes it is stated, "The country at the time was in a very unfortunate condition: burnt up by the long drought there was not a blade in the valley of the Saar, nor in the whole of Alsace." In the syllabus for the sixth lecture Major Brackenbury alludes to the "absence of green forage through drought."

Napoleon would certainly have triumphed over such difficulties; to Napoleon III. they were apparently insuperable.

[3] The organization of the French Armies is given in Appendix II. whilst the organization of the I. and II. German Armies (in outline), and that of the III. Army (in detail) is given in Appendix III.

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his skill by dovetailing into his general plan, of great simplicity, all less-essentials and counter-dispositions, which are rendered necessary by altered circumstances; but always remaining true to the one essential in strategy—seek one thing, and only one thing, the enemy's main army; and, when found, attack it. Thus the big battle would be forced on as quickly as possible; for the objective was the French Armies in the field.[1]

The three German Armies were commanded and organized as follows:—Ist Army (von Steinmetz) 60,000; IInd Army (Prince Frederick Charles) 130,000; and the IIIrd Army (Crown Prince of Prussia, with Lieut. General v. Blumenthal as his Chief of the Staff), 130,000.[2]

By August 3rd, the Ist Army approached the line of the river Saar, between Merzig and Saarbrücken. Its right was to a certain extent protected by Luxemburg, and its left would shortly be covered by the IInd Army, whose leading corps had attained Baumholder and Kaiserslautern. The IIIrd Army was well in hand around Landau, its extreme left only being still on the Rhine's right bank near Karlsruhe.

To oppose the Ist and IInd Armies, Napoleon III had four Corps, more or less concentrated, between Metz and Saarbrücken. One Corps, the 1st, was in front of Strassburg, and another Corps (the 5th) was placed to connect the two masses. The Reserve Cavalry and the Artillery Reserve was far to the rear on the Moselle and the Meurthe.

Thus in both theatres the French were standing in a dangerous numerical inferiority. The 2nd Corps now drew back from Saarbrücken, but they left the bridges and the telegraph intact. The 2nd Corps, however, only withdrew to Forbach, and was thus still in an exposed position.

Also, in Alsace, in a somewhat similar way one of Marshal MacMahon's divisions (the 2nd, General A. Douay together with Septeuil's Cavalry Brigade), had been pushed forward to Weissenburg, and were also in a very exposed and dangerous situation.[3] On arrival at Weissenburg General Douay about 9 p.m. placed one battalion in Weissenburg, keeping the rest of his force back on the Geissberg to the south of Weissenburg. The mistake was that the detached battalion was looked on as a garrison for Weissenburg, and not merely in the light of a protective detachment; nor was a single horseman attached to the post. The commander of this battalion so far misappreciated his task that he seems to have securely shut up his troops inside Weissenburg; the gates being closed, the bridges

[1] Napoleon, it will be remembered, behaved in a very similar way when forming his general plan for 1806; though the details of execution are vastly different. In 1806 Napoleon took as the general direction of his advance—Berlin; but his objective was the Prussian main army wherever it was found to be.

[2] The ages of the opposing commanders are interesting. The King of Prussia was 73; General von Moltke was 72; the Crown Prince was 39; General v. Blumenthal, his chief of the staff, was 60; General von Steinmetz was 74; and Prince Frederick Charles was 42.

Napoleon III. was 62; Marshal MacMahon was 62; and Marshal Bazaine was 59

Napoleon when he conducted his magnificent campaign for the defence of France, in 1814, was 45 years old.

[3] The situation on the night of August 3—4, of Marshal MacMahon's and the Crown Prince's forces, is shown in Map 2.

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raised, and the outposts disposed carefully and methodically along the old walls, but no posts were pushed beyond the town at all. He had, therefore, done his very best to hermetically seal all openings by which news of a hostile advance might filter through. General Douay himself visited Weissenburg that night, and received confirmation of the report that Prussian troops were at Schweigen. But he does not appear to have criticised his subordinate's very defective and perfunctory outpost arrangements; however he did arrange to send out two reconnaissances early on the 4th.

By now it was quite clear to the German Head Quarters that the French offensive had died out; and, as the Crown Prince's Army was only about half a day's march from the frontier, v. Moltke determined to commence the invasion of France in earnest; consequently the IIIrd Army was ordered forthwith to cross the Lauter. It is with these operations that we are now directly concerned.

August 4th. The action of Weissenburg:—

The short summer night passed uneventfully away, and early on August 4th the Crown Prince's Army, organized in five Corps, advanced southward in four columns, between Weissenburg and Lauterburg[1]; the General Reserve consisting of the Ist Bavarian Corps and the cavalry. Whereas Marshal MacMahon had only one Corps—the 1st—available for the defence of Alsace at this moment; the 5th Corps was, it is true, on his left, but it was dispersed between Bitsche and Saarguemines; and thus could not afford timely support either in Alsace or in Lorraine, on August 4; whilst the 7th Corps was still in the throes of mobilization, far to the southward, around Belfort.

Nevertheless the French Marshal had not even concentrated his available troops; three of his divisions were scattered in a disconnected fashion from Lembach to Strassburg; whilst his remaining Division (General Douay's, the 2nd Division) was pushed on as a covering force to Weissenburg, and had comfortably settled down there on August 3rd.[2]

The latter position was not without its merits; for the town was still encircled by its old defensible, although now unarmed, *enciente*, also the hills to the southward of the place command the town and and the Lauter valley, and also cover the Pigeonnier defile through which runs the Lembach road. Further the ground to the West of Weissenburg is extremely difficult. But the defect lay in the fact that the line of retreat, which had been selected, ran westward and lay parallel to the frontier, and was almost coincident with the front of General Douay's Division; thus the French detachment was unfavourably situated. Further General Douay's right flank was quite in the air, and was in dangerous proximity to a large wood, which was neither occupied nor sufficiently reconnoitred; and thus served as the most dangerous and weakest possible support for this open flank. Unfortunately General Douay possessed no exact information as to his enemy's whereabouts; and his cavalry halted behind his infantry, having previously marched from Sulz at the tail of the

[1] For the march orders see Appendix IV.

[2] General Douay's division was not at full strength. Two battalions (one being a Chasseur battalion, and the other a line battalion) were at Selz.

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infantry column.[1] They were thus about as much real use to the General as if they had been in Tibet. The outposts, for the night of August 3-4, were kept in too close proximity to the force they covered, the bridges over the Lauter were left standing, and were not under observation. General Douay's position was thus in reality one of considerable and imminent danger. However, on the morning of August 4th, he sent out a small reconnoitring force of two squadrons, two guns, and one battalion; but this force, which might easily have obtained invaluable information, returned at 7.30 a.m., having learned nothing. The infantry and artillery appear merely to have taken up a position on the N. slope of the Geissberg. The cavalry, however, did cross the river, and reached the frontier to the south of Schweigen. Here they learned from the inhabitants of the near presence of a Prussian army, 30,000 strong. Beyond crossing the frontier, in a perfunctory way, the cavalry did nothing further to verify this important information. Turning to their right the horsemen, therefore, worked round into the Speyer road, and returned without having seen anything more than a few hostile skirmishers. The cavalry should have pushed patrols at least as far as Lauterberg and also well to the N. and N.E. of the Lauter. Had they done so they must have established contact with the 2nd Bavarian Corps, and a surprise at any rate would then have been avoided. But the reconnaissance work was perfunctory, conventional, and, therefore, utterly incomplete. Consequently, at 8 a.m., within half an hour of the return of the reconnoitring party, the guns with the Bavarian advanced guard opened fire on Weissenburg; and thus unmistakeably proclaimed that the Germans had arrived, and the invasion of France had begun.[2] At this time General Douay was holding Weissenburg with one battalion. It should now have been abundantly clear that the Division could alone cover its retirement to Lembach, when the time came to withdraw, by remaining on the high ground, and declining to fight near Weissenburg, or on the low ground. However three more French battalions (of the 1/Turcos)[3] and a battery were now moved down into the low ground, and engaged in a hot fight with the 2nd Bavarians. Of course General Douay's Division was surprised, and it was correct to reconnoitre the enemy's strength. But this could have been done far better by one battalion, a battery and the cavalry; whilst the bulk of the force was kept in hand and concealed on the Geissberg, where it could cover the withdrawal of the reconnoitring troops, and afterwards effect its own retirement through the Pigeonnier defile. But the actual dispositions, which were made, prematurely disclosed a considerable part of the slender force at General Douay's disposal. For a time the 2nd Bavarians failed to dislodge the French from Weissenburg, because the bulk of the Bavarian artillery was marching far back in the column—a relic of the 1866 procedure. But other Prussian masses were fast nearing the scene of the action, and, by 10 a.m., two more

[1] Septeuil's Cavalry Brigade consisted of the 11th Chasseurs and the 3rd Hussars.

[2] See map 3 which illustrates the action of Weissenburg. The situation shown is just before 11 a.m.; the final German attack on the Geissberg Castle, between 2 and 3 p.m., is also indicated.

[3] They were the II, III, and IV, battalions; for the I. was kept in Algeria. French official account. Fascicule II., pp. 46—47.

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Corps, the 5th and 11th, crossed the Lauter at, and below, Altenstadt; and, rapidly pushing westwards, headed for the Geissberg. Meanwhile, about 10.30 a.m. General Douay wisely and opportunely determined to open his retreat; for he realised that the Germans were engaged in a more serious operation than a mere reconnaissance in force; but delay occurred in transmitting the General's orders to his advanced troops, and the action could not then be broken off at once. Consequently it was not long before the situation of General Douay's Division reached a rather critical stage.

Further the battery of mitrailleuses did not achieve the great results which had been expected from it. The machine guns appear to have opened fire far too soon, thus unmasking their positions, and they were then promptly and correctly silenced by the concentrated fire of German batteries, at a range at which the machine guns were helpless. The machine guns were ordered into action about 10.30 a.m. to oppose two batteries of the 5th Corps, and they came into action about 500 yards to the N.W. of the Castle. But they soon had to move back to a position on top of the hill to the west of the Castle. Here the remaining French battery also came into action. But they were soon overpowered by four German Batteries, and by 11 a.m. they had to cease fire and retire temporarily to allow the storm of hostile fire time to subside. Had these machine guns only been kept in a concealed position behind the Geissberg, until the Germans were actually attempting to storm the hill, they might have suddenly come into action, and with a terrific storm of fire have brought the assault to a standstill, and given the French a chance to slip away.

Meanwhile the guns of the 5th Corps bombarded Weissenburg from the high ground to the north of Altenstadt, and crushed out the resistance of the indomitable French infantry, who now found that they were also outflanked on the east. It was now that the unfortunate General Douay was killed; he was engaged in selecting a good position for one of his divisional batteries, from which it could cover the retreat of his advanced troops, when he was mortally wounded by a shell which burst close to him, and he died shortly afterwards at the Schafbusch Farm. Of course General Douay's death, at this rather critical juncture, was immeasurably unfortunate for the French, for it meant further delay.

The concentric advance of the Prussian masses was now well-developed, it could no longer be denied, and by noon Weissenburg was stormed. The survivors managed to regain their comrades who were in position on the Geissberg, a steep hill, on which was a strong-built castle. The Germans, flushed with success, pressed on; whilst the 11th Corps also attacked from the east and south. The French, however, made a most determined resistance, and the Germans, to finish off the action, brought up their artillery, and unlimbering forty-two guns were able to concentrate a heavy fire on the Castle, some of the guns being in action at about 300 yards range.[1] Finally, about 3 p.m., the defenders (about 450 strong) having fired away all their ammunition, and seeing further resistance was hopeless, sur-

[1] It is not certain whether all these guns actually opened fire. Prince Kraft, "Letters on Artillery," p. 31.

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rendered. Once the Geissberg had fallen the wrecks of the French Division rallied around the Schafbusch Farm, and delivered a vigorous offensive return, which gained enough respite from the conquerors to enable the vanquished to decamp hurriedly towards Wörth, using both the Pigeonnier defile and the Hagenau road. Having no ambulance wagons at the front the French had perforce to abandon their wounded.

The Crown Prince, when the action was over, directed that his tired troops should bivouac on the battlefield; and established a very complete outpost line for their protection, well to the south of Lauter, and with its left flank resting on the Rhine.

On the French side Marshal MacMahon, on this day, moved his head quarters to Reichshofen; the 1st Division of the 1st Corps, on the night of the 4th-5th August, bivouacked near Klimbach; the 2nd Division still had its detachment at Selz, but the beaten fractions had recoiled and finally halted near Sulz and Pfaffenbronn (S.E. of Lembach); the 3rd Division had moved up from Hagenau to the E. of Fröschwiller; and the 4th Division was on the move betweeen Hagenau and Wörth. Of the cavalry, one Brigade was at Lembach, one was moving on Reichshofen, and Septeuil's Cavalry Brigade had retired from Weissenburg to Lembach. The 1st Division of the 7th Corps was now in the train, on its way up to Hagenau. This was the situation of Marshal MacMahon's army on the night of August 4th-5th.[1]

Thus in this action, the first serious one of the war, the Germans had opened the campaign in a most fortunate way for themselves; for owing to the dense fog of war in which General A. Douay had allowed himself to become enshrouded, the assailants had been able to mass an Army against a Division, and, therefore, could use a steam-hammer to pulverise a nut; they had thus gained a magnificent first-blood; and had replied to the opening "stage-thunder" which had been heard in Lorraine by launching a shattering thunderbolt in Alsace; thus commencing invasion in earnest, and preparing the way for the next advance.

On August 4th the German force available to engage at Weissenburg numbered about 48,000 rifles, 3000 sabres, and 144 guns, but probably not more than half were really engaged. The French force numbered 5,200 rifles, 900 sabres and 18 guns (including 6 mitrailleuses). Thus as the French front extended for about 6,250 yards, they could dispose of only about one man to each yard, an utterly inadequate number for serious defence; especially as the Prussian numbers allowed the attackers to mass six men to the yard for attack, and distribute this force over an arc that was nearly 11,000 yards in extent.[2] The German artillery fired about 1400 rounds in the action, averaging some fifteen rounds per gun engaged.[3] The

[1] For these dispositions see Map 4.

[2] "Number of troops to the yard since 1859." Page 51.
I have corrected the French numbers to agree with their official account. Fascicule II., p. 44.

[3] Captain (now Lieut.-Col.) Hime, R.A., in a paper (1873) on the "German Artillery of 1870," gives the expenditure of shell at Weissenburg by the Germans, as 1,380 common, and 19 shrapnel; giving an average of 15·5 per gun. The loss of the German artillery was 3 officers, 20 artillerymen, and 49 horses. The Prussians had no shrapnel, and had to rely on common shell alone. When shrapnel was used it invariably belonged to the Bavarians, Hessians, Saxons, etc., for they alone carried it in their equipment.

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losses were as follows:—Germans: 90 officers, 1450 rank and file, and 90 horses. The French lost 1000 killed and wounded, also 1000 prisoners and 1 gun.

Comments on Weissenburg:—

The following appear to be the most noteworthy points with regard to the action of Weissenburg:—

It is most remarkable that this mere handful of Frenchmen should have been able to hold off an army for six hours; it speaks volumes for the spirit in which they had been trained how to die, and not how to avoid dying. Had the French troops also been encouraged to use initiative, and show real comradeship in action, there can be no doubt that two line regiments—the 78th and 96th—must have come to General Douay's assistance; for they were around Klimbach, within easy supporting distance of the 2nd Division on August 4th, and could have come up in time to enable the French 2nd Division to break off the action before the Germans had deployed their masses. Despite the cannon-thunder, which was distinctly heard raging at Weissenburg, neither regiment did anything to bring aid to its comrades in their extremity. They did not show that zeal in marching at once to the sound of the guns which the Germans so often exhibited; and consequently paid to the full for their lack of energy.

With reference to the French Cavalry, its failure to find the advancing German Army was as conspicuous as its failure to exercise any real influence in the action that followed. The Cavalry Brigade would have been simply invaluable to cover General Douay's open right flank, and give timely warning of the advent of any outflanking attack from this direction. Instead the Cavalry appear to have been placed in a valley bottom, and to have achieved nothing of any importance. At the close of the day the Cavalry joined the rearguard of the principal column, but managed before nightfall to lose contact with the Germans. We must conclude that the part played by the French Cavalry on August 4th, was trivial and utterly unworthy of its great traditions.[1]

On the other hand, there was no serious attempt made to pursue the beaten foe. The Crown Prince reached the Geissberg at the end of the action, and he must have bitterly regretted that the 4th Cavalry Division had been relegated to the tail of the marching column of the 5th Corps, and was unprofitably engaged in guarding the baggage. Thus, although it was only about 3 p.m., the French

[1] Colonel Hime in his "Stray Military Papers," pages 199—200, says that the "French Cavalry had received little or no instruction in reconnoitring duties before the war. On the outbreak of the war a torrent of orders, memoranda and circulars on these duties was let loose upon the cavalry; but as Colonel Fay plaintively says, "*les circulaires ne font rien*" ("Journal d'un officier de l'armée du Rhin"). It is ridiculous to suppose that troops can perform duties in war which they have not learnt and practised in peace . . . . Had the French Cavalry been properly instructed in reconnoitring duties at the camp of Châlons we should have heard little of their shortcomings in the field." Colonel Hime also quotes from a "Histoire de l'armée de Châlons," (in a footnote on the same pages), which states that, "it was in Châlons . . . . that our cavalry learned how to reconnoitre by regiments at squadron interval." It was this false peace training that caused the French Generals to fight blindfold in 1870.

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were allowed to slip away almost unmolested; for at the moment of victory only one regiment, the 4th Dragoons, was available; and this was near the Schafbusch Farm. It was at once pushed along the Sulz road; but the French had by now disappeared into the Steinseltz wood. The 4th Dragoons, however, moved forward close up to Sulz, and there exchanged shots with some hostile troops, and eventually returned that evening to the battlefield. The commanding officer in his report to the Crown Prince said that he advanced nearly to Sulz, which he found occupied by French infantry who appeared inclined to stand, and thus barred any further advance of the unsupported German horsemen. No serious traces of a panic-flight had been observed; but the officer reported that masses of hostile infantry were in sight on the high ground to the S.E. of Sulz, but the distance was too great for him to accurately estimate their strength. The officer, as a fact, had allowed his imagination a free rein; for at, or near, Sulz at this time there was only one French battalion. However such a state of mind is both understandable and excusable to a certain extent in war; at any rate before the big battle has cleared the air. Thus, in 1806, Murat's light horsemen were very differently handled before Jena, to the dashing and audacious manner in which they pursued, and kept on the run, the shattered Prussian and Saxon armies after Jena and Auerstädt had been fought and won.[1]

But we notice in the case under consideration that the Prussians completely lost contact after the fight owing partly to a lack of cavalry, and partly to the broken and woody nature of the ground.

As for the artillery on both sides there is not much to say. The French mitrailleuses did not by any means achieve what was expected of them, because of the prompt attention paid to them by the Prussian artillery. The lighter French guns only excelled in mobility, but otherwise were no match for the heavier and better handled Prussian artillery; inasmuch as the Prussians managed to bring over sixty guns into action, on August 4th, as opposed to the eighteen French guns, the advance made in the tactical handling of the artillery arm in Prussia since 1866 is very marked. This is also well exemplified by the way the Prussian guns co-operated with their infantry in the attack on the Geissberg castle. Their prompt action shows that they realised their true rôle, namely, to assist their infantry to conquer by all means in their power; and further that the greater the difficulties of the infantry, the closer and more intimate must be the support of their own artillery. This is the Napoleonic doctrine with reference to the handling of artillery in action.

There can be no doubt that the French 2nd Division of the 1st Corps was, and General Douay should have looked on it as, a strategical covering force; placed so as to gain contact with the German advance; harass, embarrass, and act as a brake on that advance; make the latter a matter of calculation; cause the Germans to disclose their line of advance, dispositions and strength; and by gaining all this information for his Commander-in-Chief, and meanwhile regulating his enemy's progress, General Douay would have given Marshal MacMahon ample time, and ample space, to make his neces-

[1] In the pursuit Lasalle and his light cavalry captured the fortress of Stettin; whilst Anclam fell to Becker's Dragoons!

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sary arrangements to meet the rising tide of invasion. The situation of course was simple; but in war even the simple is very difficult; also there were circumstances which considerably heightened the difficulties that confronted General Douay—firstly, the French detachment was not placed at a great distance in front of the force which it was covering, and thus it must do more fighting than retiring; and this coupled with the facts that he was confronted by an enemy who was in crushing strength; that there was no great natural barrier to delay that enemy's advance; also that the woody country, unless well watched, would screen the German movements, and, lastly, that the length of the summer day was unfavourable to rear-guard tactics. In such a case it is vital to realise that the essential is not to advance, nor to retire hurriedly—above all it is not to accept or deliver a pitched battle. An incoming flood cannot be stopped with one hand. The great essentials are to obtain early intelligence of the enemy's advance, and above all for the covering force to keep its freedom of manœuvre; and by fighting a series of *combats en retraite*, or yielding fights, compel the foe to take an hour to cover every mile of ground; this result could only be obtained by the use of the most skilful rear-guard tactics.[1]

To attain his end General Douay might have pushed an advanced guard of two squadrons and two battalions on to Weissenburg on August 3rd. Cavalry were essential, to keep the left bank of the Lauter efficiently reconnoitred. To maintain touch with the division on his left, General Douay might have pushed a small flank guard of one squadron to Klimbach; and then have kept his main body of two squadrons, three batteries and ten battalions on the Geissberg,[2] in a commanding central position; covering its line of retreat, and kept well concealed until the moment for action arrived. It was essential in this case to look on the troops in Weissenburg merely as an advanced guard, or outposts, and not as a garrison for the place.[3] Thereafter General Douay would have delayed the Crown Prince's advance to the utmost in his power, at the same time he would have used rearguard tactics to gain time by wasting the enemy's, and above all he would have avoided anything in the nature of a serious engagement, and thus have ensured gaining the time and space necessary for his commander, whilst preserving the freedom of manœuvre of his own force. The strangest thing of all is that the use and employment of these strategical covering forces, so well known to Napoleon and so constantly used by him, had been utterly forgotten in the French Army; and the doctrine underlying their use was apparently unknown in 1870.

[1] We may recall that Zieten had a somewhat analogous task in 1815, when he was placed along the Sambre to cover Blücher's concentration point at Fleurus, and gain the time requisite for the Prussian Marshal to mass his army at Fleurus, so as to oppose a French invasion of Belgium across the Sambre. This the Prussian General most successfully accomplished by his skilful handling of his Corps on June 15, 1815. On the other hand the Russian detachment on the Yalu in April—May, 1904, signally failed in its mission; for it accepted a pitched battle against greatly superior odds; and was as decisively defeated as General Douay's force was on August 4.

[2] For this organisation of the 2nd Division I have broadly followed General Bonnal's recommendations, "Fröschwiller," p. 131.

[3] It was in this way that Zieten in June 1815, only occupied the right bank of the Sambre with outposts.

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Events in Lorraine—August 4th-6th:—

Meanwhile in Lorraine the Ist Army, on August 4th, was still a day's march from the line Saarlouis—Saarbrücken. The IInd Army was, of course, further to the rear; but it was on the march between Kaiserslauten and Homburg; it was due to reach the line Neunkirchen—Zweibrucken on August 6th. It was now that a dispute arose between the commanders of these two Armies as to whether the left of v. Steinmetz's Army, or the right of Prince Frederick Charles' Army, should use the Neunkirchen—Saarbrücken line General v. Steinmetz, in a characteristic fashion, cut short the dispute by continuing his advance, and headed straight for Saarbrücken.

The General Idea, underlying the advance of the Ist and IInd Armies, on August 6th, was that they should close up to the river Saar, but without crossing it. As the French were known to be in force behind the river, it was essential, as a precautionary and protective measure, to push out advanced guards to cover the two Armies as they closed up. But General v. Steinmetz did not contemplate bringing on an action on August 6th. However, nevertheless, on this day there was fought in Lorraine the action of Spicheren; and on the same day in Alsace was fought the battle of Wörth, in which the destruction of Marshal MacMahon's Army was achieved by the Crown Prince, and strangely enough, in Alsace also, neither commander had intended fighting the battle on August 6th.[1]

Events in Alsace—August 5th:—

We must now return to Alsace and consider the decisive events that followed closely on the German victory at Weissenburg.

After the conclusion of the action, on August 4, the IIIrd Army lost contact, and was quite ignorant of the real direction taken by the beaten force. The Crown Prince assumed that Marshal MacMahon would concentrate his forces near Hagenau, and he decided, therefore, to continue his southward march heading for Strassburg. The orders for the next day (August 5th), therefore, aimed at placing three Corps in the first line running from Preuschdorf through Sulz on a front of not more than eight miles, the other two Corps being in the second line and placed behind the two wing Corps of the first line; these two latter Corps being on the alignment Lembach—Ingolsheim; whilst the 4th Cavalry Division would be between the two flank Corps on the eastern (or Rhine) side. Thus the formation is obviously for a march southward on Strassburg; for the Crown Prince had not as yet learned of the French concentration at Fröschweiler. As a matter of fact the right Corps of the first line (the 5th) did bivouac facing towards Wörth (on the night of August 5th-6th), because during its advance southward its commander learned that the enemy was to the west, in the vicinity of Wörth.

That the IIIrd Army, on August 6th, was able to wheel to the west so rapidly and fight a battle on the Sauerbach was entirely due to the fact that it halted in the old Napoleonic formation—" the

[1] For the general situation both in Alsace and in Lorraine, on August 5, i.e., on the eve of the two battles, see Map 5.

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battalion square"—and thus was in a position to continue its advance, or engage on either wing with almost equal rapidity.[1]

Disposition in depth, as Napoleon taught, is as essential in strategy as it is in tactics; although for rather different reasons. In strategy it serves to assure immunity from disaster, affords protection in front and on both flanks; and should the enemy be encountered either in front, or on the flank, he can be promptly gripped by the part of the force that is nearest to him, held fast in his position, and prepared for the blow that the reserve, formed of the other Corps, can hasten up and deliver. Such an arrangement does not rely on any cavalry screen, but simply on the security and warning that can be given by mere tactical advanced guards. It was because his dispositions, on the night of August 5th-6th, were so correct, that the Crown Prince was enabled to wheel up to his right and crush Marshal MacMahon at Wörth on August 6th; although he had not previously expected to find the French Marshal in this direction.

On the French side an important alteration in organization was made on August 5th. Napoleon III felt the inconvenience of attempting to act as generalissimo to his widely dispersed forces. Consequently he appointed Marshal MacMahon to the chief command of the 1st, 5th, and 7th Corps in Alsace; giving Marshal Bazaine the principal command in Lorraine, together with the 2nd, 3rd and 4th Corps. The French Emperor still, however, retained under his own direct command the Guard, who were at Courcelles Chaussy, and the 6th Corps, which was still at Châlons. On this same evening Marshal Bazaine's Corps were placed as follows:—2nd Corps around Forbach; 3rd Corps near St. Avold; and the 4th Corps about Bouzonville. The 3rd Cavalry Division was at Faulquemont; but the 1st Cavalry Division was still at Lunéville, and the Artillery Reserve had apparently taken root at Nancy.[2]

To return again to Alsace: on this night, the 5th (French) Corps was between Bitsche and Saarguemines; Marshal MacMahon, under whose orders it had now come, telegraphed to it to move to Reichshofen, but the orders were too concise, and they lacked clearness and precision. The Marshal also ordered up all the available troops of the 7th Corps; and on August 5th personally took up the Wörth position with the 1st Corps. On this same day the 2nd Reserve Cavalry Division (Bonnemain's) marched up and joined the Marshal; whilst during August 5th and 6th, a division of the 7th Corps also came into line.[3] Thus the Marshal had concentrated the 1st Corps, and these other troops, to deliver a defensive battle against the numerically very superior IIIrd German Army. The Marshal could dispose on August 6th of about 35,000 rifles, 4000 horse and 130 guns (of which 24 were mitrailleuses); thus all told he had consider-

[1] General Bonnal, "Froeschwiller," pp. 147—151.
For the dispositions on the night of August 5—6, see Map 6.

[2] Vide Map 5, as before.

[3] General Conseil Dumesnil in his report (dated Aug. 15) states that his 1st Brigade commenced to arrive at Reichshofen at 9 a.m., on August 5 (and it had completely arrived by 2 p.m.) The 2nd Brigade joined the 1st (near Elsasshausen) about 9 a.m. on August 6. The Divisional Artillery does not appear to have come up in time to take part in the battle.

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ably more than 40,000 men available.[1] On the night of August 5th-6th his Army bivouacked on a front roughly parallel to the Sauer, with three divisions in the first line (the 1st, 3rd and 4th), and occupying a front of about four miles.[2] The flanks were both in the air, and were not strengthened by posting troops in *échelon* behind them, or by strongly occupying villages outside them; thus they were both quite open to attack; and the reserve was carefully placed in rear of the centre. Probably Marshal MacMahon did not expect a battle on the morrow, and concluded that all his reinforcements would reach him before he was attacked. But the Marshal did very little to find out what his enemy intended doing. His cavalry remained complacently behind the infantry; and the latter also did little to protect themselves from a surprise attack. They neglected to occupy in strength the woods and villages along the Sauer, an ideal advanced line; and thus committed an analogous mistake to that which the Austrians had made at Sadowa. The French right flank too rested on that most insecure, even dangerous, support for a flank—a large wood. For these mistakes, in taking up their position, the French were destined to pay in full on August 6th.

Meanwhile the IIIrd German Army, which had quite lost contact after Weissenburg, had pushed slowly on heading southwards, and halted for the night of August 5th-6th well disposed in depth as follows[3]:—

In the first line, 5th Corps, at Preuschdorf; 11th Corps in front of Sulz; and Werder's Corps of Badeners and Würtemburghers to the west of Aschbach. Thus the front covered about eight miles. Behind Werder's Corps was the 4th Cavalry Division. In the second line, the 2nd Bavarians halted near Lembach, about five miles behind the 4th Corps; and the 1st Bavarians halted near Ingolsheim about three miles behind Werder's Corps. The disposition in depth has already been alluded to, and should specially be noticed. Thus the Crown Prince had all his forces well in hand, and could dispose of considerably more than 100,000 men.

On August 5th, the German Cavalry again picked up the trail, and reported that the bivouacs of a large French force could be seen about Fröschweiler; and that the bridge at Wörth was broken. This information, valuable as it was, was by no means complete. The Crown Prince, however, stopped any further southward advance, and determined to wheel up the IIIrd Army, on August 6th, so as to be in a position to attack the French Army at Fröschweiler on August 7th.

It was obviously useless to continue the advance on Strassburg; a very serious force of the enemy had been located to the westward, and it was rightly taken as the immediate objective, instead of a mere geographical point; because once it was crushed all Alsace would lie at the mercy of the invader. Thus, late in the afternoon of August 5th, the Crown Prince issued orders for the IIIrd Army to pivot on its right on August 6th, and wheel round westwards on the 2nd Bavarians, who would remain at Lembach. The 5th Corps would also remain at Preuschdorf; and, as it was necessary to guard

[1] General Bonnal, "Fröschwiller," p. 177, puts the Marshal's fighting strength, on August 6, at 43,000 men; and also he states that with this force were 107 guns (one had been taken at Weissenburg), and 24 mitrailleuses.

[2] Vide Map 6.

[3] Vide Map 6.

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against a French offensive made against the exposed 5th Corps, the 2nd Bavarians were ordered to drive one of their divisions straight against the French left at Fröschweiler, directly gun fire was heard near Wörth.

The outposts of the 5th Corps were pushed up to Sauer on the night of August 5th-6th, and this disclosed the fact that the French were not holding their natural advanced line; that the fords and bridges were intact and undefended; and that the damage done to the bridge at Wörth was easily repairable.

However the battle that was expected and arranged for August 7th, was actually fought on August 6th, and it must now be briefly considered.

The Battle of Wörth.—August 6th:—

The French position at Wörth may be fitly divided into four sections. The northern section lies between Langelsulzbach and Fröschweiler, the country is a tangled mass of woody slopes, very difficult and intricate, and unsuited to the action of cavalry or artillery in mass. The second section lies between Fröschweiler and the Nieder Wald, the country is certainly less broken, but it is far more enclosed, being covered with vineyards, &c., and was, therefore, also unsuited to the action of cavalry, or large masses of artillery, but admirably suited for offering a really stubborn infantry defence. The third section includes the great wood—the Nieder Wald itself. It was impossible that either side would deliver a decisive stroke in the wood fighting. The fourth, or southernmost section lies between the southern extremity of the Nieder Wald and the Hagenau Forest, and covers a space of about 2½ miles. The country here is quite suitable for the combined action of all three arms in co-operation, and, therefore, admirably adapted for the delivery of the decisive counter-stroke once the battle was ripe.

Such was the French position. The Army of Alsace had nothing to fear for its left wing; its centre was very strong, even as it was, and the French should be able to beat back all attacks on it with ease, although the most had not been made of the natural wet ditch of the River Sauer in its front. But the right flank was very vulnerable, and, moreover, it was quite in the air. It was all the more necessary, therefore, to *échelon* the cavalry, the artillery reserve, and the general reserve of the Army, behind it. Such arrangements would automatically strengthen it, and also place these troops where they would be ready to act in the most advantageous fashion, without any confusion or loss of time, directly the decisive moment arrived.

However Marshal MacMahon did not divide the battlefield into sections, and he arranged his force rather differently.

The French were disposed in the morning of August 6th, as follows:—In the first line (from right to left) were the Divisions of Lartigue, Raoult and Ducrot, the wings being slightly refused. In the second line were Michel's Cavalry Brigade, Dumesnil's Division

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of the 7th Corps,[1] Pellé's (late General Douay's) Division) Septeuil's Cavalry Division.
Reserve Cavalry Division.

Marshal MacMahon during the greater part of the battle stationed himself midway between Wörth and Elsasshausen.[2] From this position the ground to the north and west of Wörth is visible, but southwards the high ground to the south of Wörth, and also the trees of the Nieder Wald, curtail the view. The Marshal's position probably accounts largely for the fact that Dumesnil's Division of the 7th Corps formed up close to Elsasshausen, instead of in rear of Lartigue's open right flank. This Division, which constituted part of the Marshal's General Reserve, was frittered away during the action, in detachments, in the centre, the first being engaged soon after 8 a.m.[3]; and by the time Elsasshausen was captured, towards 4 p.m., the Division was exhausted and only fit to retire.

It is at once apparent there is by no means sufficient depth in the French formation, nor is there a well-defined and strongly garrisoned advanced line—such as Wellington used at Waterloo—to delay and embarrass the assailants; nor is an adequate General Reserve retained in the Commander-in-Chief's hand, to deal the "knock-out" blow when the battle is ripe. But these points will be considered later.

It was about 7 a.m., when a mixed force of the 5th (German) Corps pushed forward to reconnoitre Wörth, and opened fire on the French centre. At the roar of the opening cannonade the 2nd Bavarians sprang to arms; and, loyally acting on their orders, pushed forward *viâ* Langensulzbach, soon after 8 a.m., to attack the French left. Thus the commander of this detachment of the 5th Corps had incurred a grave responsibility; for he had precipitated an action which the Crown Prince had not intended to fight on that day. Doubtless the subordinate did not consider, or perhaps did not even know, that the noise of his guns would ensure other troops promptly engaging, and thus bring on a general action which it might be more than difficult to break off.[4] After a time the action ceased in front of the 5th Corps; but now it was evident that a fierce fight was raging near Langensulzbach, and at the same time firing broke out near Gunstett. The Chief of the Staff of the 5th Corps was present in front of Wörth. He promptly took upon himself the responsibility of ordering the 5th Corps to re-engage, so as to prevent Marshal MacMahon from concentrating all his forces against one of the wings of the IIIrd Army. In this determined resolution the Chief of the Staff received the entire approval of his Corps Commander, when the latter reached the front. The incident is most instructive; it shows the spirit of fearless acceptance of responsibility in a crisis, which permeated the German Army at that epoch. The presence of such a spirit went far to ensure ultimate victory. Consequently

[1] This division was behind the inner flanks of Lartigue's division and Raoult's division. The left of the 1st Division of the 7th Corps rested on Elsasshausen (General Dumesnil's report to the Minister of War, 2 September, 1873). Thus the position assigned to this division in the German Official Atlas for Wörth is wrong.

[2] For these dispositions, and also for the development of the German attacks, see Map. 7 The Battle of Wörth.

[3] General Dumesnil's Report—15 August, 1870.

[4] The officer was General Walther von Montbary, and his command was the 20th Brigade, with a Battery and a Squadron attached.

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the whole of the artillery of the 5th Corps came into action to support the advanced guard battery; and, by 9.30 a.m., 84 guns were in action 1500 yards to the east of Wörth, astride the Wörth—Sulz road, and about 3000 yards away from the French guns. The front of this immense battery filled nearly one mile, out of the two, on which the 5th Corps were deploying. The Corps deployed chiefly behind the guns, and the masses were kept hidden from the French.

Much about this time (9.30 a.m.), the Advanced Guard artillery of the 11th Corps unlimbered on the hill to the north of Gunstett, and opened fire on Lartigue's Division. Thus the action opened at various times along the front, growing in intensity as the morning wore on. It was not long before the 24 German guns (of the 11th Corps) overpowered Lartigue's few light guns, and drove the latter temporarily out of action. By 10.30 a.m., the artillery of the 5th Corps had also completely crushed the 6 French batteries who were directly opposed to them; and they were now free to turn their undivided attention to the French infantry, whose positions they now battered with common shell. It was shortly after 10 a.m. when General v. Kirchbach, commanding the 5th Corps, ordered the 20th Brigade to cross the Sauer and advance on Elsasshausen. The attack was not only a frontal one, but it was also premature, nevertheless it was pushed home despite heavy loss, and succeeded in making good its footing on the right bank of the Sauer without being able to advance any further.

Meanwhile the Crown Prince, from his Head Quarters at Sulz, had attempted to break off the fight; and, about 11 a.m., the 2nd Bavarians did manage to discontinue their action with Ducrot. But although the 11th Corps at this time was engaged in nothing more serious than a cannonade, the 5th Corps was really compromised; and to support it the action was, therefore, re-commenced. Further, the Crown Prince was well placed, for he had almost his entire Army under his hand, and he could dispose of at least 100,000 men, or more than double Marshal MacMahon's force; he was admirably placed opposite to that force, and there was ample daylight left in which to win a crushing victory. Thus, to make immediate use of his overwhelming numerical superiority, the Crown Prince acted correctly and wisely in sanctioning a general attack against the front and both flanks of the French position, when he actually reached the front at about 1 p.m. Further, the initiative shown by his subordinates, and the prompt action which they had taken, left the Crown Prince little more to do, on arrival, than give his approval and sanction to the measures which they had taken, and arrange that all efforts were combined, and that all the troops co-operated fully, so as to attain the one common end—the annihilation of the Army of Alsace. The Crown Prince's arrival had not been very expeditious, for the sound of heavy firing must have been audible at his Head Quarters at Sulz since 9.30 a.m.

Meanwhile the German batteries played their part well, they smothered the French positions with a heavy fire, and thus prepared the way for the infantry attacks. In the meantime the 1st Bavarians reached Görsdorf, and were able to assist the 2nd Bavarians, who now once more attacked Ducrot, and gradually drove him back into Fröschweiler.

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Meanwhile the 11th Corps, to bring relief to the 5th Corps, crossed the Sauer, above and below Gunstett, and promptly attacked the front and flank of the French right wing. This decision affords another fine example of the correct use of initiative. The Crown Prince had not yet reached the front, General von Bose (11th Corps) realised the vital spot in the French defence, and had the moral courage to cross the Sauer with his troops and promptly engage. This step led directly to the gain of the battle. But for General v. Bose's action the 5th Corps would have been crushed by the French reserve, which was behind their centre.

The eastern border of the Nieder Wald was carried, then the Albrechtshäuserhof, and also Morsbronn. These attacks were prepared and supported by 72 guns of the artillery of the 11th Corps, who were in action to the North of Gunstett, firing at about 2000 yards range.

It was about 1.30 p.m., when the Prussians issued from Morsbronn. General Lartigue must now have realised that he could not hope to retain his position on the plateau; but he wished to hurl back his most pressing foes if he could, or at any rate neutralise them for a time. He, therefore, gave the order to General Duhesme (commanding the Cavalry Division of the 1st Corps) for a Cuirassier Regiment to charge and release his compromised right wing. Instead Michel's Brigade (two Cuirassier Regiments, total seven squadrons)[1] and two squadrons of Lancers, delivered the charge under truly deplorable conditions. The ground was sodden, it had not been previously reconnoitred, it was intersected with ditches and covered with vineyards, and a hollow road had also to be negotiated. But the moment chosen was fairly propitious. The Germans were just emerging from a village, and were changing front to envelop Lartigue's division and at this moment Michel's horsemen appeared. The charge was delivered with all the old dash, and with unequalled and unquestionable gallantry; but it was crushed by the fire of the German infantry, who held the edge of Morsbronn, and with whom the horsemen vainly strove to close; many of the cavalry finally became entangled in the village streets, and were there shot down at point blank range.

But even so, at the cost of about 800 men,[2] the disordered and retiring French infantry gained a most opportune breathing space; were enabled to rally; and shortly after even to retake the offensive. Further, and most important of all, this desperate charge, so resolutely driven home, was one of the causes which led to the action being

[1] The two Cuirassier Regiments were the 8th and 9th; of the 9th Cuirassiers one squadron was absent on baggage duty. The other regiment, the 8th Cuirassiers, are well known to Englishmen; for on June 16, 1815, this regiment formed part of Guiton's Brigade, and took part in Kellermann's great charge at Quatre Bras on that day. It was a Cuirassier of this regiment who captured the King's Colour of the 69th Regiment—the very flag that has now been so fortunately restored to us.

(The other regiment in Guiton's Brigade on June 16, 1815, was the 11th Cuirassiers).

[2] In the charge the 8th Cuirassiers lost, 15 officers, 280 men, and 275 horses; and the 9th Cuirassiers lost; 30 officers, 398 men, and 366 horses. General Michel's Report to General Duhesme, dated August 12, Colombey. General Duhesme's report of same place and date confirms these losses; and this report also gives the losses of the two squadrons of the 6th Lancers who charged with Michel's Brigade: and places these losses at 13 officers, 143 men and 167 horses (of which 20 were officers' chargers).

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prolonged until the light waned, and when the French finally left the battlefield in grave disorder night was at hand to cast a cloak over their withdrawal, and spare them the rigours of a close tactical pursuit. Thus the price paid was by no means excessive. The execution, however, requires a few remarks. Part of Michel's force undoubtedly advanced in column; and two out of the three regiments, appear to have delivered the charge in column. Nor was any reserve retained in hand, nor any attempt made to work up close to the enemy and covered by the ground, and thus surprise the Prussian infantry; nor was the least effort made to deliver the blow on the most telling point, the Prussian flank. It would appear that the valley of the Eberbach would have afforded just that covered line of approach which would have enabled Michel to work up unseen to within 600 yards of the open Prussian left; and then a charge of mail-clad horsemen, delivered in line, riding at a gallop and knee to knee, might have had every chance of getting home; for the surprise would have been complete and the distance that had to be covered was short. Had Bonnemain's Division (of four Cuisassier Regiments), which was destroyed about an hour later than Michel's Brigade, only been united with Michel's in delivering a decision-compelling blow on the open left flank of the 11th Corps, the result might well have been very different; for then the chances would have ben in favour of the 11th Corps being ridden over, and ridden down, and shattered beyond all hope of recovery on August 6; indeed such a charge might well have proved worthy to rank alongside Kellermann's magnificent effort at Marengo, which changed the fate of a great battle. For, at the moment in question, the 5th Corps had not been able to make any progress on the right bank of the Sauer, and the frontal attack of the 11th Corps, beyond the river, was also in a rather critical condition. The fate of the battle was, therefore, in the balance, and it is just at such moments that a well-handled and resolutely engaged cavalry force may easily turn the scale. It was a great chance for a real leader of horse like Cromwell, Seidlitz, Murat or Kellermann to make the most of with rapid determination; but like all such moments it was a very fleeting chance, and required a mind quick to form a resolution and equally quick to execute the plan, so that the moment did not slip away unutilised. As matters turned out mere gallantry was insufficient, because once again the higher leadership was at fault.

However Lartigue's infantry now attempted to retake the Albrechtshäusershof; success at first crowned the effort, but any really serious advance was crushed at once by a terrific fire opened by the German guns, who were in action near Gunstett, and the attack died out when the survivors were constrained to seek cover from the real hail of death which beat up into their faces.

The 11th Corps now energetically pressed forward, and wheeling to the right forced a way into and through the Nieder Wald, about 2 p.m.; this success was of great importance, for any further advance must now allow the 11th Corps to take the French centre in reverse, whilst it was heavily engaged in front with the 5th Corps. Lartigue's division was now finally driven back, the French right lay open, and affairs were rapidly reaching a critical stage for Marshal MacMahon. Although Lartigue personally seized a rifle, to encourage

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his men, his shattered division was forced back towards Reichshofen; but the 3rd Zouaves, caught in the Nieder Wald, fought grimly to the last, and suffered a loss of 67% of their effective strength—losing nearly 600 killed and 900 wounded. The proportion between killed and wounded is so extraordinarily high that it should be noticed,[1] it bears eloquent testimony to the grim fury of the struggle in which these gallant men were engaged, in the dim recesses of that great wood. It was about this time that the head of the Würtemburg Division (two brigades) reached the front and crossed the river Sauer, in the wake of the 11th Corps.

Meanwhile towards 1.30 p.m., General v. Kirchbach (commanding the 5th Corps) personally appreciated the signal success that the 11th Corps had achieved over the French right, and he now decided to engage his whole Corps on the right bank of the Sauer. By 2 p.m. Wörth was entered; but naturally the cover given by the town proved too tempting to the weaker spirits, and the German officers had some difficulty in pushing on their men beyond the place. To the south of Wörth, after heavy fighting, the 5th Corps also mastered the high ground by the Calvaire, about 2.30 p.m.; and then the 5th Corps commenced to work forward to the westward of Wörth heading for Fröschweiler.

The French Marshal now retired his Head Quarters to Elsasshausen, and called on General Ducrot for all the troops whom he could spare. The two regiments of Wolff's Brigade were promptly sent up. Until now this brigade had been held in reserve. On arrival one of the Regiments delivered a counter-attack, and penetrated into the Nieder Wald; they were, however, beaten back and driven out by fresh Prussian troops who reached the front; to prevent the victorious Prussians closing on Elsasshausen, two French Horse Artillery batteries came into action and fired case into the advancing enemy. The other regiment of Wolff's Brigade then made a counter-attack towards Wörth; but this effort was soon overwhelmed by fire and crushed.

Meanwhile General v. Kirchbach, about 3 p.m., ordered seven batteries forward to Wörth, to come into action on the high ground on the right of the Sauer; the remaining guns of the 5th Corps also advanced and unlimbered about 500 yards to the N. of Wörth along the Wörth—Görsdorf road; and the 1st Bavarian Divisional Artillery, who since 1.30 p.m. had been in action alongside, and to the north of the guns of the 5th Corps, also now moved forward.

It was about 3 p.m. when Marshal MacMahon ordered the eight batteries of his Artillery Reserve to come into action in front of Elsasshausen and bombard the Nieder Wald; and at the same time he ordered General Bonnemains with his Cuirassier Division (of four regiments) to charge the German 5th Corps. Under conditions that made it almost impossible to hope for any success, but a mere gain of time, and allow the shattered centre and left of the Marshal's Army to gain Nieder Bronn, the Cuirassiers delivered a succession of most gallant charges, which were, however, beaten off entirely by fire, and achieved no other result than that of momentarily delaying the steady

[1] The normal proportion is more nearly 1 man killed to 4 men wounded. In their defence of the Nieder Wald the 3/Zouaves lost 43 officers, and 1,568 men. "Historiques des Corps de Troupe de l'Armée Francaise," pp. 418–419.

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advance of the 5th Corps. Before 4 p.m., this dramatic episode was concluded; and at the same time the 11th Corps stormed Elsasshausen.

Whilst the Cuirassiers were still engaged in sacrificing themselves, the Artillery Reserve galloped up, and the guns unlimbered on a small hill, between Elsasshausen and the Wörth—Fröschweiler road. Two batteries came into action facing the Nieder Wald (in support of the two horse artillery batteries who were already in action). Hardly had these guns fired a couple of rounds apiece than Elsasshausen was carried, and the Prussian skirmishers pushed on through the hail of case straight towards the batteries. Eleven guns were taken, and the remainder only escaped with great difficulty. The six other batteries had, in the meantime, come into action facing Wörth; but they unlimbered much too close to the Prussian infantry. They were promptly smothered by a heavy short range gun and musketry fire; their position soon became untenable; and they had to retire, leaving behind seven guns. Thus Marshal MacMahon's Artillery Reserve of 48 guns had exerted no decisive influence whatever on the action. But immediately afterwards the 1st Turcos (or Algerian Sharpshooters), seeing the captured guns in Prussian hands, delivered a perfectly spontaneous counter-attack on the advancing and victorious Prussians. Despite the fact that the Turcos had lost 600 men only two days previously at Weissenburg,[1] yet at this moment, when the battle was lost, the three battalions formed in a deployed line and flung themselves upon the Prussians with the bayonet. The attack at first succeeded owing to the impetuosity with which it was delivered, and the Prussians were pressed back to the Nieder Wald; but then the Turcos were fired at from all sides, and finally were forced to recoil after losing about 50% of their strength. Had only 10,000 of these veteran troops been available at this moment, and had they been used to drive home a decisive counter-attack, in mass, suitably disposed in depth, with its flanks secured, and closely supported by the fiercest possible artillery fire, the fate of the battle even now might easily have been turned. But, under the circumstances, the formation actually used was the most suitable for a small force of infantry to employ when they were engaged in attacking infantry who were supported by the fire of a powerful and dominant artillery force.

At about this time, after the 1st Turcos had been beaten back, the IIIrd Army were disposed on the arc of a huge circle around Fröschweiler,[2] and threatened to crush the centrally placed French Army as between the two rapidly closing jaws of a vice. Had the Würtemburg Division, which had crossed the Sauer after the 11th Corps, only advanced straight against Reichshofen, as it was well placed to do, it must have ensured Marshal MacMahon's complete destruction. Luckily for the French the Würtemburg Division allowed itself to be deflected from its direct advance on Reichshofen, and it became involved in the heavy fighting which was raging on its right. To have pressed on, towards Reichshofen, would have been

[1] The loss which this gallant regiment actually suffered at Weissenburg, was 19 officers, and 560 men. "Historiques des Corps de Troupe de l'Armée Francaise," pp. 424—425.

[2] Vide final attack as shown on Map 7.

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audacious, for it would have isolated the division temporarily; but the decisive result that must then have been obtained was worth a great risk. When, at about 5 p.m., Fröschweiler was finally carried by a tremendous concentric attack that closed in on it from the north, east, and south, prepared and supported by the fire of 150 guns, the French line of retreat was not utterly cut off; and thus at 5.30 p.m. the shattered French Army commenced its disorganised flight along the still open road towards Reichshofen. For a time Ducrot's Division, which was probably the least disordered, covered the retreat; and then, when the day was utterly lost, Guyot de Lespart's Division of the 5th Corps reached the battlefield from Bitsche, having taken nine hours to cover fifteen miles; this fresh division[1] now took up a position to the north of Reichshofen, and in front of Nieder Bronn; and for a time this checked the pursuit; but finally about 7 p.m. the division was forced to decamp, and fell back partly in the direction of Saverne, and partly towards Bitsche. Marshal MacMahon's routed Army had meanwhile taken the Saverne road, and pressing on in disorder all through the night, reached Saverne by noon on August 7th; whilst the IIIrd Army bivouacked on the battlefield between Reichshofen and the Sauer.[2] Had Blücher and Gneisenau been in the place of the Crown Prince and his mentor, Blumenthal, it is possible that arrangements would have been made for an immediate and relentless pursuit to be opened directly the victory was assured; and that the execution of the man-hunt might have rivalled the famous pursuit that set the seal on the triumph of Waterloo. But in the hour of victory, on August 6th, only the Divisional Cavalry were available, and some of these regiments appear to have been still on the Sauer's left bank. Such squadrons as were on the spot were thrown forward, and were boldly handled, but unity of command was lacking and no great or decisive result was achieved at that moment, when but little more was necessary to make a clean sweep of the beaten French Army, and complete the great success which had crowned the German arms in Alsace.

The 4th Cavalry Division had remained during the battle near Ingolsheim, some ten miles away from the scene of the fighting on August 6th; finally, about 6 p.m. the Division received orders to move up to Gunstett. It reached the latter place at about 10 p.m. The delay in issuing this order probably arose from the fact that, until comparatively late in the day, the Crown Prince was quite undecided as to the course that events would probably take. But it does seem that orders might easily have been sent, between 1 and 2 p.m., after the Crown Prince had actually reached the front, for this Cavalry Division to close up behind the German left at once; so that in the case of victory, it could rapidly cross the Sauer and destroy the rudderless French Army as it drifted away from the field in a practically defenceless condition. Considering how clearly this same lesson had been brought home to the Germans on August 4th, it is remarkable that the same mistake was again repeated on August 6th. It is only another proof of the almost insuperable difficulty that underlies the opening of a prompt and vigorous pursuit; a difficulty

[1] The strength of this division was about 7,000 men and 18 guns.
[2] For situation, on night of August 6—7, see Map 8.

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which only the Great Captains can surmount in the hour of their triumph; for they, and they alone, do not waste the precious hours in digesting their joy over their victories.

On the next day, August 7th, the 4th Cavalry Division opened a somewhat tame and conventional pursuit at day-break. In conjunction with the Bavarian Cavalry Brigade, the German horse pushed on and reached Buxwiller at 11 a.m., and halted there until 5 p.m., then advancing further it collided with some fugitives at Steinburg about 8 p.m. The fugitives massed, and boldly stood their ground; the German cavalry—30 squadrons and 18 guns—then drew back to Buxwiller.[1] Thus the contact, which had been lost by the divisional cavalry on August 6th, was momentarily regained on August 7th, and then again was definitely lost. It was not until August 26th, about three weeks later, that the Crown Prince's horsemen once more got touch of Marshal MacMahon's Army (now the Army of Châlons), and this time they preserved that contact until after the great victory at Sedan, which settled the ultimate fate of the luckless Marshal and his most unfortunate army.

The forces which had been actually engaged on August 6th were as follows:—

On the German side 76,500 rifles, 5,500 sabres, and 300 guns; whereas on the French side, Marshal MacMahon could only dispose of 43,000 men, and 130 guns and mitrailleuses. The extent of the French defensive position was roughly about 7,000 yards, and thus the Marshal could deploy six men per yard; under the circumstances, and handled as they were, these numbers were utterly insufficient. The German front, in attack, covered altogether about 15,000 yards, and thus the attackers could dispose, on this enormous arc, about 5½ men per yard at the decisive stage of the battle.[2]

The losses in the hard fought action were extremely severe. The victorious Germans lost about 500 officers and 10,500 men killed, wounded and missing; whereas the Army of Alsace lost 600 officers and about 20,000 men killed, wounded, prisoners and missing, and also 1 eagle and 33 guns. The French Army thus suffered a total loss of nearly 40% of its effective strength, which is eloquent testimony of its discipline and fighting qualities.[3] During the action the German guns fired nearly 10,000 rounds, giving an average of over 40 rounds a gun.[4]

Thus August 6th saw the delivery of two shattering blows to the

[1] For situation, on night of August 7—8, see Map 9.

[2] "Number of troops to the yard since 1859," p. 51.

[3] General Bonnal points out ("Fröschwiller," p. 442) that about 200 French officers and 9,000 French soldiers were taken prisoners (unwounded) by the Germans. Thus the percentage, of actual loss from the hostile fire, works out to approximately 25% for the Army of Alsace; and assuming that nearly 100,000 Germans took part in the battle, then the victors lost about 10% from the same cause.

[4] Col. Hime, in the paper already quoted, gives the exact number as 9,776 common shell, 12 shrapnel, and 64 case. The average per gun he also gives as 42·6; whilst the Artillery lost in the action 12 officers, 137 men, and 300 horses.

The small number of case shot is interesting; but it must not be overlooked that the Germans were the assailants, and naturally would require to use less case shot than the defenders.

For purposes of comparison of ammunition expenditure, we may recall that the 78 British Horse and Field guns fired 9,467 rounds on June 18, 1815, in the battle of Waterloo. "History of the Royal Artillery, 1815—1853"; by Colonel Hime, page 136.

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French, one being delivered at Spicheren in Lorraine; whilst the other, and by far the more deadly one, was delivered at Wörth in Alsace. These two blows definitely threw the French on to the defensive.

Comments on the Battle of Wörth:—

Only some of the more important points can be considered. Firstly, at Wörth, the Germans made no hermaphroditic holding, or containing attacks. All attacks delivered were driven home in the fiercest way, even the frontal attacks. For the Germans knew that only by behaving in this fashion can an enemy be held to his ground, prevented from shifting troops at will, and finally worn down and prepared for the decisive blow. The Germans realised clearly that it is a fatal mistake to rob an attack of its sting, or energy, by allotting to it any less decisive rôle than that of breaking the enemy's front. Further, that not only every subordinate commander, but every man also, must realise that victory depends on his making a personal breach in the enemy's position. An army trained in this doctrine may well prove irresistible, for it will believe itself to be so. Fire must, therefore, only be looked on as a means of allowing the assailants to close with the defenders and obtain the decision there with the point of the bayonet; for as Frederick the Great taught, "To conquer is to advance."

Next, with reference to the Artillery; the different methods employed by the two nations in handling their guns, is most striking. On the German side the guns went into action early, were massed in large batteries, concentrated their fire on those objects which were of the greatest tactical importance at the moment, thoroughly co-operated with their own infantry, and were prepared to support it closely at all stages of the battle, especially when it was brought to a standstill by the usual obstacle—the enemy's fire; and to redouble their fire when the enemy's reserves were seen, or to crush any counter-attack at its inception. Certainly two batteries of the 11th Corps were kept in hand; but the reason is convincing—there was not sufficient room available to allow them to unlimber. Since 1866 the tactical handling of the German artillery had indeed made great strides in advance; for in this arm the Germans had practically returned to the sound teachings of Napoleon.

On the French side, the guns were fought stubbornly and devotedly, but there was no unity of direction; consequently batteries came into action as a rule alone, their fire was dispersed, they changed positions and targets under battery arrangements, and thus failed to influence the action in any decisive way; and were impotent when compared with the concentrated and well-handled masses of Prussian guns. The failure of the Marshal to decisively influence the action with the 48 guns of his Reserve Artillery has already been noted. The number of guns was amply sufficient,[1] but the handling and the moment chosen for their interference in the battle were at fault. Had the guns only been suddenly unlimbered to overwhelm the open left of the 11th Corps when it emerged from Morsbronn, and had Michel's and Bonnemains' Cuirassiers been at hand to make the most of the

[1] Sénarmont had only 30 guns at Friedland (1807), yet with them he succeeded in wresting victory from a doubtful battle, by using "the case shot attack."

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opportunity gained by the guns; then Marshal MacMahon might have justly claimed, as Napoleon so often did, that, "It is with the artillery of my Guard that I compel victory; for having it always in hand I can bring it into action when and where I will." But the misused Artillery Reserve, on August 6th, was incapable of decisively influencing the battle, and was necessarily destroyed. Each artillery indeed repeated in war what it had been taught in the previous peace time; for war is the harvest of peace.

Next, with reference to the leadership on the French side. It is an axiom that a commander should mass every available man for the battle; for even half a battalion may turn the scale. Yet it was this simple, but fundamental, rule which Marshal MacMahon neglected. All the troops of the 1st, 5th, and 7th Corps in Alsace had been put under his command on August 5th; and yet he accepted battle, whilst no less than 27,000 rifles, 1,500 sabres, and 144 guns were absent from the field. As matters went the Germans had to put forth all their energies to crush the 43,000 Frenchmen who did actually oppose them; but had Marshal MacMahon only had the other 30,000 men and 144 guns on the spot, and been prepared to engage them at 2 p.m., then the issue of the battle would never have been in doubt, and the Germans would have suffered a crushing defeat in Alsace on August 6th. As it was the Marshal paid for his vital mistake with the loss of the first great battle of the war. This proves the truth of Napoleon's teaching, that an army must always be concentrated and ready at any moment to meet an enemy with its full strength; and that all the various portions of the army must constantly be ready to support and co-operate with the other fractions, so that the whole force can deliver an united blow; thus the army must always be massed under the commander's hand; then, even if the enemy's strength is not accurately gauged, or should events turn out very differently to what is expected, yet the whole force is in hand, ready to act in the most favourable way, and at a moment's notice.

The next point for consideration is the way that Marshal MacMahon actually took up his position with the force which he did concentrate at Wörth on August 6th.[1]

A glance at the map will show that the battlefield is practically enclosed between a line joining Nieder Bronn and Langensulzbach on the north, and on the south by the Hagenau Forest. It is divisible (as has already been noted) into four divisions. The northern section has a frontage on the Sauer of over 3,000 yards, and includes all that very difficult and woody country around Langensulzbach, Nehwiller and the Fröschweiler wood.

The second division is the space of over 2,500 yards between the Fröschweiler wood and the Nieder Wald. This section being covered with vineyards, &c., is quite unsuited to the action of cavalry, or artillery, but it is an admirable one in which to offer a really stubborn infantry defence.

[1] General Bonnal most courteously and most kindly gave me permission to make three slides from his Atlas, to illustrate this very point, and to use them at my lecture. However, any officer who makes a rough tracing of the map (No. 7) of the Battle of Wörth, can easily show on it, by means of coloured pencils, the suggested dispositions; and he can then compare the suggested arrangements with those actually adopted by the Marshal, which are given on Map 7.

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The third division includes the Nieder Wald, and this covers some 2,000 yards.

The fourth, and southern, section is the open stretch of ground that lies between the Nieder Wald and the Hagenau Forest, and measures more than 4,000 yards in width; it is suitable for the combined action of all three arms in co-operation, and, therefore, admirably suited for the delivery of the decisive counter-stroke.

Thus the Army of Alsace, when in position at Wörth, had little or nothing to fear for its left wing; further it should be able to beat back with ease any attacks on its centre; but its right flank was quite in the air, and extremely vulnerable. Again, considering the way he actually took up the position, there was too little depth in the Marshal's dispositions.

Consequently General Bonnal suggests[1] that the Marshal should have disposed his force on August 5th for a defensive battle on the Sauer, as follows:—The main bodies of the five available divisions should be hidden from the hostile view, but it was essential that their front and flanks were covered by advanced posts. Therefore the force would be disposed in the following way:—The main body of Ducrot's (1st) Division would bivouac south of Nehwiller; and would cover its left with a company at Jägerthal; its front with a battalion at Langensulzbach; and would further post a reserve of four battalions in Nehwiller to act as a reserve to these advanced posts. Cavalry patrols, pushed northwards, and across the Sauer, would suffice to give early warning of the German advance.

Raoult's (3rd) Division would be massed in the valley to the south-west of Fröschweiler; the Division would hold Wörth with a battalion, and have some small posts along the Sauer; whilst the reserve of two battalions and two squadrons would be posted in the valley to the N.E. of Elsasshausen.

Lartigue's (4th) Division would bivouac behind (west of) the Nieder Wald, its outposts would be on the Sauer, and it would also hold Morsbronn and Forstheim to cover the open right flank. A cavalry regiment would be posted at Morsbronn to reconnoitre widely to the east, south, and south-east. The reserve to Lartigue's outposts, two battalions, would bivouac in the valley to the east of Eberbach.

Pellé's (2nd) Division, which had suffered so severely at Weissenburg, would act as a central reserve, and bivouac at Reichshofen, with it would be Bonnemains' 2nd (Cuirassier) Reserve Cavalry Division. Pellé would detach five battalions and three batteries (who had not been engaged at Weissenburg) to take post at Engelshof, and act as a reserve to the right wing. Meanwhile Conseil-Dumesnil's Division of the 7th Corps, and Duhesme's Cavalry Division of the 1st Corps, would bivouac at Gundershofen. Dumesnil would arrange to reconnoitre and cover his right flank.

The suggested arrangements show a real disposition in depth, which is just as necessary on the defensive as ever it is in attack. A well-defined advanced line has been occupied, to delay and embarrass the attack, and compel the assailant to fully and prematurely disclose his intentions. The strong reserves to this outpost line will gain the time necessary to deploy the Army of Alsace for battle, and

[1] "Fröschwiller," pp. 189—204.

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also ensure it the space in which to make the deployment. Further, ample troops are kept in hand to act as a general reserve, so as to deliver a decisive counter-stroke directly the enemy is worn out in the preliminary *combat d'usure*, and the battle is ripe for the decisive act. The dispositions also amply secure the Achilles heel of all defenders—the flank. Again no further deployment of the force is to be made before the action; thus it is kept well in hand, and ready to act in any direction with the least possible confusion and loss of time. Naturally if Marshal MacMahon had managed to concentrate Guyot de Lespart's Division of the 5th Corps, in time to take part in the battle, he would have added it to his general reserve, and stationed it with Dumesnil's Division of the 7th Corps. These extra troops would be additional proof, if such were needed, of the soundness of the suggested dispositions; for added to the Reserve they must have given enhanced power to its blow, and hence it must obtain an even greater and more decisive result.

When finally deployed for a defensive battle on the Sauer, the force would probably have been disposed as follows:—Ducrot's (1st) Division would then hold a front of about 1 mile with six battalions, and also hold Langensulzbach, as well as covering its left with a small detachment at Jägerthal. The reserve for this section would form up to the south of Nehwiller, and the latter place would be garrisoned by three battalions.

Raoult's (3rd) Division, in the centre, would hold Wörth and the vicinity with three battalions, one acting as local reserve. Five battalions would then hold the 1200 yards front to the south of Wörth; Elsasshausen would be garrisoned by one battalion; and three battalions would act as section reserve, and form up behind Fröschweiler.

Lartigue's (4th) Division would hold the Lansberg Farm (the Albrechtshäuserhof) with one battalion, keeping three battalions in local reserve at Eberbach; whilst six battalions would hold a front of under 2000 yards along the eastern edge of the Nieder Wald, and parallel to the Hagenau road.

As at least twenty-four hours were available for strengthening the position, the villages of Langensulzbach, Wörth, Nehwiller, Fröschweiler, Elsasshausen, Eberbach, and Forstheim, could have all been placed in a thorough state of defence, by the troops allotted to them, assisted by the engineers. Emplacements and alternative positions could also have been dug by the gunners to accommodate all the guns.

The five battalions and three batteries of Pellé's (2nd) Division, who had not been engaged on August 4th, and had passed the night at Engelshof, would be detailed to hold Forstheim so as to cover the right flank. The remainder of the Division would form up to the S.W. of Fröschweiler, and act as a reserve to the French centre.

The General Reserve, or force with which the decisive counter-attack was destined to be delivered, would consist of Conseil-Dumesnil's Division of the 7th Corps, the Artillery Reserve, and the heavy cavalry. These troops (11 battalions, 8 batteries, and 6 Cuirassier regiments) would be massed, the infantry to the west of the Nieder Wald and close to Eberbach; near the Division, but to the S.W. of

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it, would be placed all the heavy cavalry, about a mile W. of Eberbach. (The light cavalry would be employed on the service of intelligence, and in covering and screening the position, and its flanks).

The artillery, as soon as the front line was attacked, would be placed as follows:—The artillery of the 1st Division, massed to the N.W. of Fröschweiler; the artillery of the 3rd Division, astride the Wörth—Fröschweiler road; the artillery of the 4th Division, on the high ground near the Lansberg Farm. The Artillery Reserve, at the outset, might form up in the Eberbach valley, to the north of the 2nd Division, until the preliminary fighting had made it quite clear where it was required to come into action in mass.

Leaving out the extremities at Langensulzbach and Forstheim, the main position, as suggested, measured under three miles; and to hold it 35,000 rifles were available. Thus the numbers available were quite sufficient to ensure a lengthy and obstinate resistance being offered on the selected position.[1] The flanks of the position were undoubtedly the weak points; but in the suggested dispositions they are enormously strengthened by the troops posted in *échelon* behind them. As Marshal MacMahon was prepared to deliver a defensive battle to the IIIrd Army, which he considered was considerably stronger than the Army of Alsace, he (the Marshal) was bound to make the most of the Sauer as an obstacle, and thus should have destroyed all the bridges as far down as Gunstett (inclusive). Those near Dürrenbach might have been left standing to entice the Germans across the Sauer on this flank.

As a rallying position, in case of need, the engineers (assisted by the inhabitants) would have prepared as a second line—Nieder Bronn—Reichshofen—Gundershofen.

It merely remains to add that the Marshal, after the action began, must have jealously husbanded his general reserve, until the Germans had spent their energy, and expended their reserves, in a vain endeavour to carry the second line; refraining, at all hazards, from frittering his reserve away so as to reinforce the front lines. Then when the battle was at last ripe, and the Germans had engaged their last closed body of troops, the Marshal would have brought his Reserve Artillery into action, and prefaced the final stroke by deluging the assailants with a heavy but brief storm of time shrapnel.[2]

During this bombardment the general reserve, horse and foot, would have closed up under cover, and prepared to drive home the attack energetically, against the now open German left, with every available man. Thus prepared, and supported to the last, by the heaviest possible artillery fire, and delivered by a mass of fresh troops, both horse and foot, launched as a surprise, and driven home against the attacker's flank, the result could hardly have been in doubt.

Victory would then have sprung directly from correct dispositions in depth, correct employment of the preparatory action, correct

[1] At Waterloo (18 June 1815). Wellington had about 70,000 men of all arms and nationalities to hold three miles of front; and under the circumstances this force did not prove excessive. But the Crown Prince's attacks were not equal to Napoleon's in energy or audacity.

[2] As the Reserve Artillery would have been able to select their position, they would naturally select the range that suited the shorter boring of the French time fuze.

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use of the advanced line of the river Sauer, the correct handling of the general reserve, and above all to superior leadership.

But, as matters, turned out, the French failure is traceable as directly to lack of all depth in their dispositions; the almost entire neglect of the defensive line of the Sauer; the absence of a real reserve, destined to deliver a decisive counter-stroke at the pshychological moment of the battle; an entire lack of entrenched points échelonned behind the open and exposed right wing; further, the reserve was wrongly placed, being massed entirely behind the centre; also there was no real organization of the defensive battlefield into suitable sections; nor were there any real defensive preparations made. Consequently the gallant French Army of Alsace succumbed to their equally gallant, but more energetic opponents; and at Wörth once more was proved the truth of the Emperor's saying, "a General who allows himself to be attacked is already half beaten."

Thus history repeated itself. For in the middle of the XVIIIth century Frederick the Great and his veterans inflicted on Marshal Soubise and his French and Austrian Army a shameful defeat at Rossbach (1757); half a century later the tables were turned, and at Marengo (1800) and at Austerlitz (1805) the disgrace was wiped out, so far as the Austrians were concerned; one year later the French Army, superior in organization and far superior in leadership to the Prussian Army, avenged Rossbach on the fields of Jena and Auerstädt (1806), where they crushed the Prussians. Another half a century passed away, and the Prussian Army was now both better organized, and it possessed by far the greater leader. This time it was the turn of the Prussians to conquer. Thus we see that each side being equally devoted and gallant, superiority of arms have nothing to say to the decision, but the determining factor is always the same; it is—the man.

A brief consideration of the strategic situation after the defeats of Wörth and Spicheren on August 6, 1870[1]*:—*

Although the opening of the campaign had been disastrous, yet on August 7th, all was by no means lost. The French Head Quarters could still dispose of about 250,000 men; and lying athwart a German advance on Paris lay the broad line of the Moselle, strengthened by the fortresses of Thionville, Metz, and Toul. The Army of Lorraine (four Corps) would naturally fall back to Metz; Marshal MacMahon and his Army of Alsace (three Corps) could have then massed near Toul; and Marshal Canrobert would have brought up the troops from Châlons (two Corps), and, taking post at Frouard,[2] he would connect the two wings. To force the river frontally against these arrangements would have been a serious and doubtful undertaking, despite the crushing numerical superiority of the Germans, and their undoubtedly increased *moral*. If they tried to turn the line, then the French gained valuable time, in which to rally and reorganize thoroughly. But, even so, this manœuvre would hardly

[1] Any general map of the Campaign, or a map of France, will show the position of the places named in this connection.

[2] Frouard is at the junction of the Meurthe and Moselle, and 5 miles to the N. of Nancy.

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lead to a decisive French success; it would probably only mean a gain of time.

There was, however, an operation which could have been undertaken by the French armies after Wörth and Spicheren, and one which might quite easily have led to decisive results.[1] As the Germans lost touch after these battles, the French may be safely considered as free agents, and, therefore, able to retreat in practically any given direction. To carry out the suggested manœuvre the French Army would require to retire southwards, in a direction perpendicular to the general line of the German advance; and concentrate holding the Vosges, from Saverne to Chateau Salins.[2] Marshal MacMahon's Army would halt facing N.E., from Lützelstein to Saverne[3]; whilst the Army of Lorraine would throw one Corps into Metz (preferably the 2nd, for its commander was an Engineer, and the Corps had been mauled at Spicheren), whilst the 3rd and the 4th Corps, and the Imperial Guard would mass at Chateau Salins, and connect with Marshal MacMahon. The 6th and 7th Corps, and all other available troops, would also be called up to act as a reserve; and thus the French would have taken up an extremely strong position with about 250,000 men.[4] It is not suggested that the French Army should entrench themselves to the teeth in this position, or hold it indefinitely. But as it was impossible to deal the Germans an immediate "knock-out" blow after August 6th, some plan was needed to ensure a gain of time necessary for the organization of all France's armed forces; and the delay to the Prussian advance, that this plan must cause, would automatically gain the time requisite for the preparation of a decisive counterstroke. Further, this perpendicular retreat withdrew the Army of Lorraine far from the deadly influence that a great fortress, like Metz, might well exert over its commander at such a time. No slight gain. Safety now lay in manœuvring, not in seeking protection behind the armour of a large fortress, and allowing the army to become "*une force morte.*[5]"

As the position was extremely strong both frontally and on its right, the Prussians would have had to turn its left—a very difficult and rather dangerous operation; further complicated by the proximity of the fortress of Metz and also by the river Moselle. At any rate the occupation of this position, by the main French field forces, would have compelled the Prussians to turn aside from their victorious westward march, and put forth their whole strength to deal with the situation.

It was the withdrawal of the Army of Lorraine to Metz that rendered this plan of concentrating southwards impossible.

[1] I am indebted for this idea to one of Colonel Grouard's strategical studies; but unfortunately I have mislaid the title of it.

[2] Chateau Salins is 18 miles to the E. of Frouard, and 16 miles to the N. of Lunéville.

[3] If it is considered that Marshal MacMahon's Army was too shattered to hold the Vosges defiles against the German III. Army, then a Division of the Guard might have been at once railed down from Metz to ensure the defence of the Vosges at all costs. So far the Guard had not been engaged, and they were picked troops of excellent quality and *moral*.

[4] Further behind the French Army would lie the whole of the South of France, with ample room for manœuvre, and also security of communications for sending up supplies, reinforcements, etc.

[5] Napoleon.

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As for the IIIrd Army, once Marshal MacMahon's precipitate flight had uncovered the south flank of the Army of Lorraine, it would appear that the Crown Prince let slip a magnificent chance of playing a decisive part on the battlefields around Metz, and crushing there, beyond all hope of recovery, the military power of the Second Empire. But after Fröschweiler the Prussian Staff, despite its attention to detail, and its energy, showed far too much circumspection, and also it lacked that audacity, which is always the hall-mark of a Great Captain at such a supreme moment.

Concluding remarks:—

The broad lesson that we must all draw from 1870 is that attack is the surer defence. It is a lesson that we are apt to forget in England. Further, the defensive, as practised by the French in 1870, cannot be called real resistance to invasion. For it was utterly dissimilar to Frederick the Great's defence of Silesia in 1757, after the battle of Kolin, when Prussia was opposed by France, Austria and Russia—a defence which has rightly immortalised the Prussian King. Nor is there any analogy between the defensive as practised by the French in 1870, and Napoleon's magnificent defence on the river Adige around Mantua in 1796; or his historic campaign of desperate defence, when he sought to actively resist the crushing Allied invasion of France in 1814. All the three campaigns—1757, 1796 and 1814—exemplify real resistance to invasion; in each the commander made his opportunity, and then, without hesitation, promptly made the most of that opportunity. But in 1870 things were very different. Masterly inactivity, in other words passivity, was now the keynote; as it always must be in the school of fortress strategy, which does not wage offensive war, but rather suffers attack. As in fortress strategy the plan was simple, it was to do nothing; and doing nothing naturally failed.

Further, despite their magnificent infantry weapon, the French were beaten; because in war men and not weapons, decide the issue. Though the French Army was as gallant as of yore, the superior leadership was very defective, owing to the pernicious doctrines that had been disseminated, and the military atmosphere which had surrounded the leaders before the war. These two things must be held largely responsible for the failures of the French Marshals in front of their better trained and sounder opponents. Thus 1870 affords another proof that a sound doctrine is far more valuable than mere text-books.

In conclusion there are three warnings which I would give to those who are studying 1870 for examination purposes, and for whom this lecture is especially intended.

Firstly then I would warn you against seeing in 1870, or for that matter in any other single campaign, a revolution in the art of war. We must rather regard 1870 as one in a sequence of almost numberless campaigns, and, therefore, look merely for evolution. Or as one of the most distinguished members of our Institution has so clearly put it:—" The art of war does not date its birth from the 4th August, 1870. The Franco-German War was but one (and by no means the

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most important) scene in "the bloody and impassioned drama"; and we can no more understand the principles of its fire-tactics without a knowledge of previous campaigns, than we can understand the plot of a play by witnessing the last Act only.[1]"

Secondly, I would warn you to use some sounder and less hackneyed criterion than that of mere success. Although the Germans won, it is wrong to suppose that they did everything right; on the contrary, they made a great number of mistakes, only the French made more, and the French mistakes were vital ones. If our study of 1870 is to be a profitable one we must recognise the mistakes made by the Germans, as well as those perpetrated by the French. To allow us to appreciate these mistakes; and the true worth of the lessons taught by this, or by any other campaign, we must have a sure touchstone which we can apply. The only infallible touchstone is Napoleon's practice of the art of war, and his precepts. If we refer back all questions, both in strategy and tactics, to the teachings of the great Emperor, then we shall always be able to detect the true gold from the gauds and baubles, as well as from the mere dross.

Thirdly, I would warn you, that 1870 must always be regarded in the light of an experimental war, for such indeed it was.[2] In this war, for the first time, and on a large scale, breech loader was pitted against breech loader. In 1864 the breech loader had been first used by an army; but the war was not serious—except, of course, for the beaten side. In 1866 the Prussians again encountered an enemy armed with the muzzle loader; an enemy whose tactics were conventional and as obsolete as the muskets with which they were armed. But in 1866 there was very serious fighting; and thus from this campaign the Prussians learned many valuable lessons, which they were quick to assimilate in the short peace time that followed. But in 1870 things were very different. The Germans now faced an enemy, in whose hands was the most murderous infantry weapon that the modern battlefield had seen. However the French had failed to read aright the clear teachings of history, or they must have realised how they could profit most from their very superior weapon. Instead, they sought advice from the school of fortress strategy; and, breathing that impure atmosphere, they considered that victory could most certainly be obtained by remaining rigidly on the defensive, and allowing their more virile antagonists to shatter themselves against positions which were garnished with these accurate and deadly weapons. How false this experimental theory was the result has clearly proved; and the result was absolutely in agreement with the teachings of history, and the doctrine taught by Napoleon. But from their unhappy experiences the French learned their lesson; and a lesson learned in such a fashion is not lightly forgotten; the mistakes they made in their experimental campaign of 1870 are mistakes they are most unlikely to repeat.

The war was also an experimental one on the German side. Their tactics were undoubtedly defective. Because they had never before been called on to face an infantry armed with breechloaders;

[1] "Infantry Fire Formations," p. 6, in "Stray Military Papers"; by Lieut.-Colonel H. W. L. Hime, late R.A.

[2] I am deeply indebted to Colonel Hime, late R.A., for much advice and many valuable suggestions in this connection.

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and not having before experienced the rapid, accurate fire of breech-loaders they had not made sufficient allowance for it in their previous peace training. This is proved by " those grim graves that stud the battlefield of Gravelotte—S. Privat"[1]; and they show that, opposed to the breechloader, the German tactics required great modifications.

Further the experimental nature of the war on the German side is amply proved by the handling of their cavalry divisions which covered their advancing armies. In 1866 the cavalry were not used in this fashion at all. But in 1870 we find the German cavalry far-flung, particularly in v. Moltke's advance to Châlons and Sedan (after Gravelotte). But the handling was experimental, for it had not been tried in modern war before, against an enemy who could, and did, oppose it with approximately equal numbers of well trained horsemen. Thus the Germans could not draw on past experiences to solve the many problems which must arise when handling large bodies of horsemen in this fashion. In proof of this assertion I would again draw your attention to the markedly different employment of the 4th Cavalry Division, by the Crown Prince, up to August 6th—in other words, whilst Marshal MacMahon's cavalry was still in being—and contrast it with the way in which it was used on, and after, August 7th, and especially after August 18th. The difference is so striking, that it must cause us to pause before we deduce that the later procedure is the normal way in which cavalry can, and will always be used in future. Consequently 1870 cannot be safely quoted as resolving the difficulties attendant on employing these large bodies of strategical cavalry. The conditions were absolutely abnormal. The French cavalry was almost annihilated at Wörth, or shut up in Metz; thus the advance of the German cavalry, after Gravelotte, was practically unopposed by either regular, or partisan, cavalry divisions; consequently from this experiment we can draw no useful lesson for guidance, as to the breadth of front which cavalry divisions can cover when protecting the advance of their own army; or the distance in front of their own army to which it is safe to push them out. Had the French opposed their cavalry divisions to the advanced German cavalry divisions then these points would probably have been definitely solved. At present they are pure theory.

The history of the art of war, however, teaches very clearly that, in advancing to gain contact and seek a battle, a commander should dispose his force suitably in depth; and should cover his advance, not with cavalry divisions far-flung to the front, for this arrangement merely serves to give timely warning of his approach, but that he should adopt Napoleon's procedure, which was to advance, well disposed in depth, and covered by strategical Advanced Guards. These covering masses sought for the enemy, gripped him when found, and then held him fast, whilst the reserve came up and dealt him the death blow. This procedure cannot be dismissed as pure theory, or as an indeterminate equation; for it has been tried on several occasions by the Emperor, and we can both study and understand its application under many and varying circumstances. It has long emerged from the experimental stage. But I hope I have said enough to show you that 1870 must be considered in the light of an

[1] Lieut.-Col. Hime, late R.A.

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experimental war; and that it is not either safe, or sound, to rely on the teachings of that war alone to act both as the foundations and superstructure of one's military knowledge.

Lastly I must apologise for the necessarily sketchy way in which I have dismissed so vast a subject in so short a time; the lecture, therefore, must merely be looked on as an introduction to the events of the Special Period in Alsace, but not as a more serious, and by no means as a complete, study of them.

APPENDIX I.

The maps are based on the following authorities:—

1 and 6 are based on the German Official Account and Atlas, and checked by the French Official Account.

2, 4, 5, 8, and 9, are based on General Bonnal's Atlas, and the French and German Official Accounts.

3 is based on the map in the German Official Account, and the maps of the action given in General Bonnal's Atlas. The groundwork is based on the survey.

7 is based on the maps in the French and German Official Accounts, and the maps in General Bonnal's Atlas. The groundwork is based on the survey.

Errata in the Maps 2, 4, 5, 8 & 9.—For "Weissemburg," read "Weissenburg"; and for "Fröschwiller," read "Fröschweiler."

APPENDIX II.

THE ORGANIZATION OF THE FRENCH ARMY.

Commander-in-Chief — The Emperor, Napoleon III.
Chief of the Staff — Marshal Le Bœuf.
Commanding the Artillery — General Soleille.

Corps.	Divisions.	Brigades.
(With Commander; Chief of the Staff; and Commander of the Artillery).		
Imperial Guard.		
General Bourbaki, General D'Auvergne, General Pé d'Arros.	I. General Deligny.	General Brincourt. General Garnier.
	II. General Picard.	General Jeanningros. General De Lacroix.
	Cavalry. Genl. Desvaux.	General du Fretay. General de France. General du Preuil.

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Corps.	Divisions.	Brigades.
6th Corps.		
Marshal Canrobert, General Henri, General Labastie.	I. General Tixier.	General Péchot.
		Genl. Le Roy de Dais.
	II. General Bisson.	General Archinard.
		General Maurice.
	III. General Lafont de Villiers.	General de Sonnay.
		General Collin.
	IV. Genl. Levassor Sorval.	Genl. de Marguenat.
		Genl. de Chanaleilles.
	Cavalry. Genl. de Salignac-Fénelon.	General Tilliard.
		General Savaresse.
		General de Béville.

(Only about 40 battalions and 6 batteries of the 6th Corps actually reached Metz from Châlons).

THE ARMY OF LORRAINE (Marshal Bazaine).

2nd Corps.		
General Frossard. General Saget. General Gagneux.	I. General Vergé.	General Valazé.
		General Jolivet.
	II. General Bataille	General Pouget.
		Genl. Fauvart-Bastoul.
	III. General de Laveaucoupet.	General Doëns.
		General Micheler.
	Cavalry. General Lichtlin.	Genl. de Valabrègue.
		General Bachelier.
3rd Corps.		
Marshal Bazaine. (then General Decæn, then Marshal Le Bœuf). General Manèque. Genl. de Rochebouët.	I. General Montaudon.	General Aymard.
		General Clinchant.
	II. General de Castagny.	General Nayral.
		General Duplessis.
	III. General Metman	Genedal de Potier.
		General Arnaudeau.
	IV. General Decæn.	General de Brauer.
		Genl. Sanglé-Ferrière.
	Cavalry. General de Clérembault.	General Bruchard.
		Genl. de Maubranches.
		General de Juniac.
4th Corps.		
General de Ladmirault. General Osmont. General Lafaille	I. Genl. de Cissey	General de Brayer.
		General de Golberg.
	II. Genl. Grenier.	General Bellecourt.
		General Pradier.
	III. Genl. de Lorencez.	General Pajol.
		General Berger.
	Cavalry. Genl. Legrand.	General de Montaigu.
		Genl. de Gondrécourt.

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THE ARMY OF ALSACE (on and after August 5).

Commander — Marshal MacMahon.

Corps.	Divisions.	Brigades.
1st Corps.		
Marshal MacMahon. General Colson (then General Faure). General Forgeot.	I. General Ducrot.	General Wolff.
		General de Houlbec.
	II. Genl. A. Douay. (then Genl. Pellé).	General de Montmarie.
		General Pellé.
	III. General Raoult.	General L'Hériller.
		General Lefebvre.
	IV. Genl. Lartigue.	General de Kerléadec.
		General Lacretelle.
	Cavalry. Genl. Duhesme.	General de Septeuil.
		General de Nansouty.
		General Michel.
5th Corps.		
General de Failly. General Besson. General Liédot.	I. General Goze.	General Saurin.
		General Nicolas.
	II. Genl. Labadie d'Aydrein.	General Lapasset.
		General de Maussion.
	III. Genl. Guyot de Lespart.	General Abbatucci.
		General Fontanges.
	Cavalry. General Brahaut.	General de Bernis.
		Genl. de la Mortière.
7th Corps.		
General F. Douay. General Renson. General de Liégeard.	I. Genl. Conseil-Dumesnil.	General Nicolai.
		General Maire.
	II. General Liébert.	General Guiomar.
		Genl. de la Bastide.
	III. Genl. Dumont.	General Bordas.
		General des Portes.
	Cavalry. General Ameil.	General Cambriel.
		Genl. Ducoulombier.

RESERVE CAVALRY DIVISIONS.

Division.	Brigades.
I. General du Barail.	General Margueritte.
	General de Lajaille.
II. General de Bonnemains.	General Girard.
	General de Brauer.
III. General de Forton.	General Prince Murat.
	General de Grammont.

NOTE.—It will be seen from the foregoing that the Corps commanded by the Marshals had four divisions, and the others three only. In the Corps commanded by Marshals the Cavalry Divisions

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had three brigades, but in the other Corps two only. The organization of the Guard was different from that of the other Corps, for it had only two divisions, one of "Voltigeurs" and the other of "Grenadiers."

The Brigades had a varying organization, some consisted of three, and others of two regiments; the latter was the commoner organization.

Line Regiments were usually organized in three battalions, each of six companies.

Chasseurs were organized in battalions each of eight companies.

Cavalry Regiments were organized in four or five squadrons each.

Artillery Batteries consisted of six guns.

APPENDIX III.

THE ORGANIZATION OF THE GERMAN ARMY.

Commander-in Chief	—	King William of Prussia.
Chief of the General Staff	—	General von Moltke.
Minister of War	—	General von Roon.
Chancellor	—	General von Bismarck-Schönhausen.
Commanding the Artillery	—	General von Hindersin.

I. ARMY.

General von Steinmetz in command, with General von Sperling as Chief of the Staff; and General Schwartz commanding the Artillery.

This Army included:—

7th Corps (General von Zastrow);
8th Corps (General von Goeben); and after August 5th, the
1st Corps (General von Manteuffel); together with
1st Cavalry Division (General von Hartmann); and the
3rd Cavalry Division (General von Gröben).

The strength of the I Army was:—

75 Battalions,
64 Squadrons, and
45 Batteries.

II ARMY.

Prince Frederick Charles in command, with General von Stiehle, Chief of the Staff, and General von Colomier, commanding the Artillery.

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This Army included:—

The Guard (Prince Augustus of Würtemburg);
2nd Corps, Pomeranians, (General von Fransecky);
3rd Corps (General von Alvensleben II);
4th Corps (General von Alvensleben I);
9th Corps (General von Manstein);
10th Corps (General von Voigts-Rhetz);
12th Corps, Royal Saxon, (Crown Prince of Saxony);

together with:—

5th Cavalry Division (General von Rheinbaben), and
6th Cavalry Division (Duke William of Mecklenburg-Schwerin).

The strength of the II Army was:—

181 Battalions.
156 Squadrons, and
105 Batteries.

III ARMY.

Commander — The Crown Prince of Prussia.
Chief of the Staff — General von Blumenthal.
Commanding the Artillery — General Herkt.

Corps.	Divisions.	Brigades.
5th Corps.		
(Commander; Chief of the Staff; and Commander of the Artillery).	9. General von Sandrart.	17. Colonel v. Bothmer. 18. General v. Voights-Rhetz.
Genl von Kirchbach. Col. von der Esch. Colonel Gaede.	10. General von Schmidt.	19. General von Henning. 20. General W. von Montbary.
11th Corps.		
Genl von Bose. Genl. von Kaminski. Genl. Hausmann.	21. General von Schachtmeyer. 22. General von Gersdorff.	41. Col. v. Koblinski. 42. Genl. v. Thile. 43. Col. v. Kontzki. 44. Genl. v. Schkopp.
1st Bavarian Corps.		
Genl. von der Tann-Rathsamhausen. Col. von Heinleth. Genl. von Malaisé.	1. Genl. v. Stephan. 2. Genl. zu Pappenheim. Cuirassier Brigade.	1. Genl. Dietl. 2. Genl. v. Orff. 3. Genl. Schumacher. 4. Genl. v. d. Tann. Genl. v. Tausch.
2nd Bavarian Corps.		
Genl. von Hartmann. Colonel von Horn. General Lutz.	3. Genl. von Walther. 4. Genl. v. Bothmer. Lancer Brigade.	5. Genl. v. Schleich. 6. Col. v. Wissell. 7. Genl. v. Thiereck. 8. Genl. Maillinger. Genl. v. Mulzer.

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Corps.	Division.	Brigades.
Werder's Corps		
Genl. von Werder. Col. von Leschzonsky.	*Würtemburg Field Division.*	
	Genl. v. Obernitz. Colonel v. Bock. Colonel v. Sick.	1. Genl. v. Reitzenstein. 2. Genl. v. Starkloff. 3. Genl. v. Hügel.
	Cavalry Brigade.	Genl. v. Schéler.

(Total—15 battalions; 10 squadrons; and 54 guns).

Baden Field Division.	
Genl. v. Beyer. Col. v. Leszczynski. Col. v. Freydorf.	1. Genl. v. La Roche. 3. Genl. Keller.
Cavalry Brigade.	Genl. v. La Roche-Starkenfels.

(Total—13 battalions, 12 squadrons, and 30 guns).

NOTE.—There was also a Corps Artillery of 24 guns.

Division.	Brigades.
4th Cavalry Division.	
Genl. Prince Albrecht of Prussia (senior).	8. Genl. v. Hontheim. 9. Genl. v. Bernhardi. 10. Genl. v. Krosigk.

The following troops came up later and joined the III Army:—

6th Corps.		
Genl. von Tümpling. Col. von Salviati. Col. von Ramm.	11. Genl. v. Gordon.	21. Genl. v. Malachowski. 22. Genl. v. Eckartsberg.
	12. Genl. v. Hoffmann.	23. Genl. Gündell. 24. Genl. v. Fabeck.
2nd Cavalry Division.		
Genl. von Stolberg.		3. Genl. v. Colomb. 4. Genl. v. Barnekow. 5. Genl. v. Baumbach.

Thus the strength of the III Army up to and including the battle of Wörth, was:—

128 battalions; 102 squadrons; and 80 batteries.

Subsequent reinforcements raised it to:—

153 battalions; 134 squadrons; and 96 batteries.

NOTE.—The German organization in 1870 is somewhat akin to our own to-day. All the Corps were normally divided into two divisions; and the latter were organized into two brigades. Each

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brigade consisted of two regiments; and each regiment was formed of three battalions (usually two line battalions and a fusilier battalion). The battalions were further subdivided into four companies each, the companies being numbered consecutively, from 1 to 12, right through the regiment. Companies were divided into divisions (or *Zug*); there were also sub-divisions (or *Halb-zug*), and also sections.

To each division four batteries were attached, and also a cavalry regiment (of four squadrons), corps artillery was also allotted to each Army Corps at the rate of about six batteries. Two horse artillery batteries were also given to each cavalry division.

Thus in the German organization there is no scope for personal brilliance, or mediocrity, up to the Army Corps command inclusive. It was in the size of the I, II, and III Armies that the personal worth of the commanders first becomes noticeable.

It will be remembered that Napoleon proceeded on very different lines; for he apportioned the size of the Corps in accordance with the known capabilities of the Marshal, with whom he entrusted it.

Our divisional organization to-day is entirely on German lines. The Japanese organization in Manchuria also followed the German model; for their divisions had a normal organization, but their armies were of varying size.

APPENDIX IV.

The following disposition, issued by the Commander-in-Chief of the III Army, at 4 p.m. on August 3rd, is reproduced for the information of officers, in order to show the system of order-writing in vogue in the German Army of 1870, for a move on a large scale.[1]

Head Quarters, Landau, 3rd August.

It is my intention tomorrow to advance with the Army as far as the Lauter, and to throw vanguards across it.

With this object the Bienwald will be traversed on four roads. The enemy is to be driven back wherever he is found.

The separate columns will march as follows:—

(1). Bothmer's Bavarian Division will continue as Advanced Guard, move on Weissenburg, and endeavour to gain possession of the town. It will guard its right flank by moving a suitable detachment *viâ* Böllenbronn to Bobenthal; it will break up from its bivouac at 6 a.m.

(2). The remainder of Hartmann's Corps, inclusive of Walther's Division, will break up from its bivouac at 4 a.m., and move, avoiding Landau, *viâ* Impflingen and Bergzabern upon Ober-Otterbach.
The trains of the Corps will be moved forward as far as Appenhofen in the course of the forenoon.

[1] Prussian Official Account of 1870-71. First Part, Second section, pp. 119—120.

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(3). The 4th Cavalry Division will concentrate to the south of Mörlheim at 6 a.m., and march *viâ* Insheim, Rohrbach, Billigheim, Barbelroth, Capellen, as far as the Otterbach, 4,000 paces eastward of Ober-Otterbach.

(4). The 5th Corps will break up from its bivouac in Billigheim at 4 a.m., and march *viâ* Barbelroth, and Nieder Otterbach to Gross-Steinfeld and Kapsweyer. It will form its own Advanced Guard, which will cross the Lauter at S. Remy and the Wooghäusern, and place outposts on the heights on the far side. Trains remain at Billigheim.

(5). The 11th Corps will start at 4 a.m., and move *viâ* Steinweiler, Winden, Schaidt, across the Bienwald to the Bienwald hut. It will form its own Advanced Guard, which will press forward over the Lauter, and place outposts on the heights on the further bank. Trains at Rohrbach.

(6). Werder's Corps will march along the main road to Lauterburg, and endeavour to gain possession of that town, and place outposts on the far bank. Trains at Hagenbach.

(7). Von der Tann's Corps [1st Bavarian Corps] will break up from its bivouac at 4 a.m., and move along the main road *viâ* Rülzheim to Langenkandel, to the westward of which village it will bivouac. Trains remain at Rheinzabern. Head quarters of the Corps at Langenkandel.

(8). My position in the forenoon will be on the heights between Kapsweyer and Schweigen, and as far as I can foresee, my head quarters will be transferred to Nieder Otterbach.

(signed). Frederick William,
Crown Prince.

NOTE.—As reports which came to hand showed that a serious collision with the French, on August 4, was probable, the Crown Prince sent out verbal directions in addition to his written orders, instructing all the columns to afford each other mutual support. This support is most marked in the action that followed.

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Some Remarks on Artillery Umpiring at Manœuvres.

By CAPTAIN H. E. MOLESWORTH, R.G.A.

THE following two extracts from "Training and Manœuvre Regulations, 1909," govern to a great extent all present day umpiring with artillery.

In para. 57 (1) we read: "The principal difficulty in regulating "the progress of the fight lies in the tendency of the troops to ignore "the effect of fire." And in sub-heading (9) of the same paragraph: "to ensure that due regard is paid on all occasions to the effect of "artillery fire, in arriving at decisions, the umpires specially told off "to artillery units should watch the progress of the operations and "endeavour to give the senior umpire in the locality full information "as to the dispositions of the artillery and the effect of its fire before "the troops come into collision."

During last manœuvres it was impressed on umpires and assistant umpires that their rôle was not to interfere with the movement of troops, but to give them information, in the preliminary phase, as to when they were coming under fire; and subsequently when within 800 yards of hostile troops to order them to display casualty screens in proportion to the losses they were considered to have suffered. The initiative was left to the commanders of units as to the formations they should adopt and the amount of support they should bring up to their firing lines before continuing their advance.

On all sides it was agreed that the system of casualty screens worked very well. The opposing forces were not more than half a mile apart, the umpires with each side met in the space between the forces, discussed the relative strengths, &c., and returned to the units they were attached to and gave the necessary orders.

What was not so satisfactory was the amount of information given in the preliminary phases, that is, during the time the troops were advancing to within 800 yards of their opponents. Casualty screens were not supposed to be raised from the effects of artillery fire, and infantry unit commanders, unless ordered to raise them, took it to mean they could advance quite unconcerned. At the same time the umpires who accompanied them were as a rule quite unaware that they were exposed to the fire of hostile artillery, the reason

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being that the opposing artillery seldom got any credit for their fire, owing to the information nearly always arriving too late for the umpires to act on it.

The system of forwarding the information as to the dispositions of the artillery and effect of the fire was as follows:—

The assistant umpires with the artillery units were ordered to make hand sketches, showing the position of the guns, and to forward them by their mounted orderlies to the divisional umpire. The divisional umpire sent them on to the umpire concerned with the opposing force.

By the time the hand sketches were made, the assistant umpire's orderly had found the divisional umpire, who might be five miles away, and the divisional umpire had sent them on to the umpire concerned, the whole situation had probably changed; the original target offered to the artillery had come on quite unconcerned and quite unaware of having been exposed to a devastating fire. The information was in nearly every case too late.

The use of red glass with heliographs, if there was sufficient sun, was of course an excellent and rapid method of conveying the information to troops that they were under fire, but I do not think it was much used, owing to the fact that it deprived the battery commander of the use of a heliograph and one or more signallers which he considered were more usefully employed in assisting to establish and maintain communication with divisional and brigade head quarters.

The delay in the arrival of the information during the preliminary phase would seem to be due then to the following causes:—

The distance it had to be conveyed, insufficiency of orderlies to convey it, the time taken in the preparation of one inch hand sketches from a half inch map, and the rather cumbersome method of transmitting all information through the divisional umpire.

The method of reporting at stated intervals would also appear unsuitable in the case of artillery units, owing to the probable absence of the assistant umpire's orderly with a "nil" report to the divisional umpire, at the very time the unit he was with was in action against hostile troops whom he had no means of informing of the fact.

The allotting of their due credit to artillery units on manœuvres will always offer considerable difficulty, but the following suggestions for the more rapid transmission of information are offered:—

Assistant umpires should be given at least another mounted orderly each. If available, it would be better to have two horsed orderlies for cross country work direct to the umpires with the opposing forces, and one cyclist orderly to take reports to the divisional umpire. Skeleton maps on a one inch scale should be provided on which the position of the guns and, if firing indirect, the position of the observing post should be shown.

The rough sketch shown in the example would appear to convey all the information required by the umpire with the opposing forces.

(The Example is shown on the following page).

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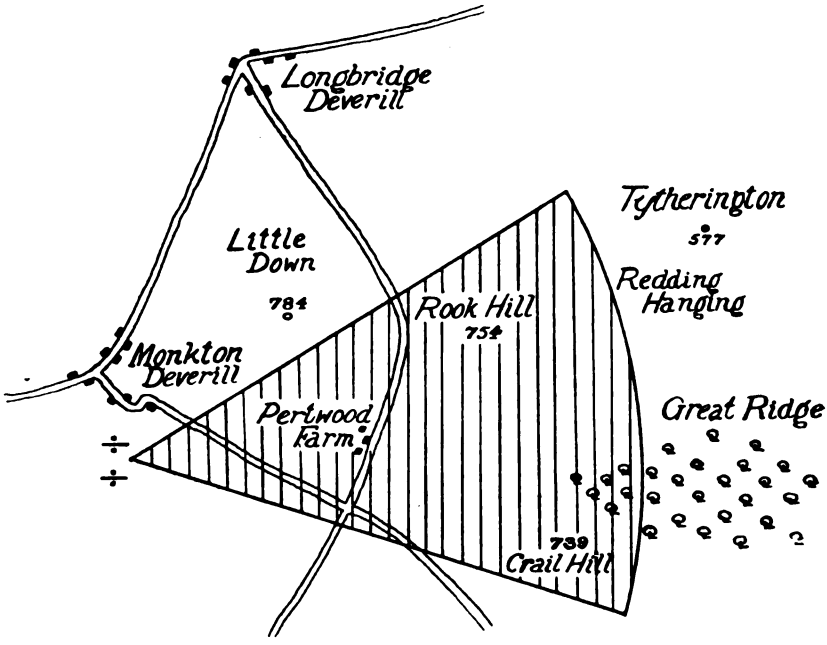
EXAMPLE.



Troops coming into the shaded arc who can see (and consequently can be seen from) the O.P. at point 784 on Littledown, are under fire from 12 18-pr. guns ½ mile south of Monkton Deverill.

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A Fuze Scale for 6-inch Howitzers.

By CAPTAIN A. H. WEBB, R.G.A.

OF the making of slide rules there is no end. The "Pocket fuze scale for 60-prs.," described in the October "Journal" by Lieut. W. F. Armstrong, suggests the thought that a description of a similar store constructed for use with 6″ howitzers at Rhayader Camp last year may simplify the calculations of B.C's practising with this gun.

Two complications had to be considered, viz:—

(1). That for practice purposes ranging is carried out with 120 lb. common shell, after which the projectile used is the 100 lb. shrapnel with fuze T. & P. 62.

(2). That the angle of sight has to be added to or deducted from the verified quadrant elevation before looking up the corresponding Q.E. for the lighter shell.

Anything tending towards "automaticity" which saves a much harassed B.C. from juggling with two range tables against time ought to be welcome.

In the diagram, which represents an open page of a small sketch book and was originally executed in waterproof ink, the left hand column shows Q.E. for 120 lb. shell, the second column the corresponding Q.E. for 100 lb. shell. The third column is the "slider," a strip of cartridge paper passed through three slots cut in the open page, and shows in its initial position the normal fuze settings for the Q.E's in column 2 for bursts on graze. The pointer at the graduation 30 comes opposite the normal barometer reading, 30″, in column 4, which is sub-divided to show inches of barometer reading against 30ths of fuze, in accordance with the principle laid down in "Garrison Artillery Training," Vol. II., that one-thirtieth of fuze should be deducted for every inch below 30″ of barometer reading.

Moving the slider until the pointer comes opposite barometer reading 29″ in column 4 will bring fuze 29 opposite the Q.E. (in column 2) for fuze 30 in the initial position of the slider, *i.e.*, one-thirtieth is deducted.

The slider is constructed first and divided logarithmically, so that by the movement above described one-thirtieth fuze is deducted all up the scale.

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Example of use (vide diagram).

Barometer 28″, angle of sight + 1° 30′, verified Q.E. for 120 lb. shell 26 degrees.

Deduct 1° 30′ from 26°, look opposite 24° 30′ in column 1 for the Q.E. for 100 lb. shell in column 2, *i. e.*, 15° 40′.

Set the pointer of the slider opposite 28″ in column 4.

Opposite 15° 40′ in column 2 read fuze 23¾ on slider.

The order will then be "Fuzes 22¾, 24¼."

The elevation will be 15° 40′ + 1° 30′ (angle of sight) = 17° 10′.

The 100 lb. shrapnel is only used with the two highest charges, and a strip to cover column 2 can easily be made out, showing the Q.E's corresponding to those in column 1, when the lower charge is to be used.

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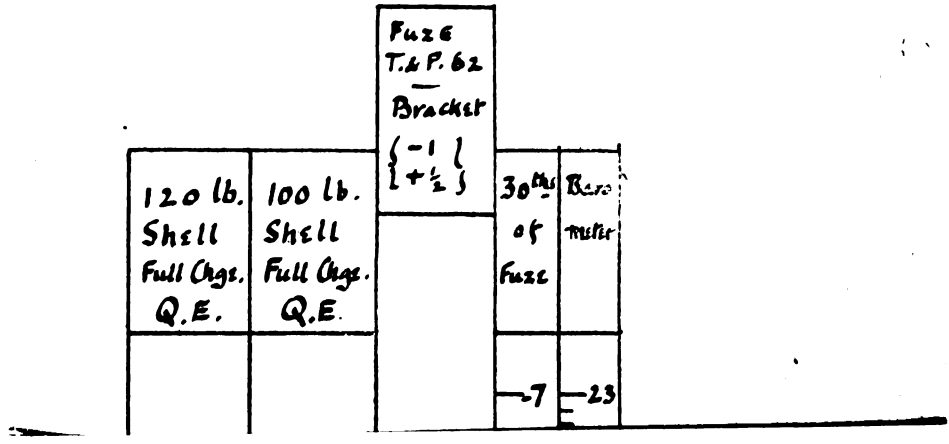

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BERNADOTTE.

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NAPOLEON'S MARSHALS.

12. BERNADOTTE.

By MAJOR H. M. DAVSON, R.H.A. (With map).

JEAN Baptiste Jules Bernadotte was born at Pau on the 26th January, 1764. He was the son of an advocate and began his life's work in a lawyer's office with a view to his entering the legal profession. Finding however, that office life was distasteful, he, in 1780, enlisted in the Royal Marine Regiment, when he went for some voyages on board ship and was afterwards quartered in Corsica.[1] At the outbreak of the revolution, being then *sous-officier* and adjutant of the 60th regiment of the line, he saved the life of his commanding officer during the preliminary troubles at Marseilles, which brought him into favour and won him rapid advancement.

In 1792, he served as colonel under Custine,[2] and next year he commanded a demi-brigade under Kleber, upon whom he made such a favourable impression as to cause that general to make much use of him as a detached commander.

1794:—

In this year Bernadotte was promoted general of division in the army of the Sambre and Meuse. He served with distinction at Fleurus, on the eve of which battle he captured the village of Trazegnies at the point of the bayonet, and afterwards out-manœuvred Kray and his Austrians near Maestricht. Following on this he crossed the Meuse and marched on the Roer, which river he forced after a sharp affair at Juliers. In this fight Bernadotte had only 12,000 men whilst the enemy had more than double that number, but nevertheless the French general attacked, and in an action which lasted from 8 a.m., to 7 p.m., he was completely successful, despite the fact that Kléber had his hands too full to render him any assistance. That general however, wrote as follows: "I cannot praise "General Bernadotte too much. At all times under the hottest fire he "makes his dispositions with heroic *sang froid*. His courage and "intrepidity have decided the fate of this battle." Bernadotte then captured Maestricht, after a siege lasting eighteen days, and took 8,000 Austrians with the town.

[1] The story that Bernadotte served in India is not authentic. De Marbot tells an anecdote of his having met a sergeant in after life who had served with him there, but it cannot be verified.

[2] A well tried general of the monarchy, who had served under Marshal Saxe. He was afterwards accused of treachery before the convention and executed.

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1795:—

In the next campaign, he took part in the passage of the Rhine at Neuwied, and shortly afterwards seized Altdorf. The future King was at this time a most popular general. He was brave almost to indiscretion, and was honoured by the men whom he led, and trusted by the leaders who commanded him. His tactical successes also, were such as to call forth praise even from superior beings, and on one occasion the directory went so far as to write, "The Republic is accustomed to see those who obey you triumph."[1]

Bernadotte commanded the rearguard in Jòurdan's retreat to the Rhine, and was then ordered to take 2,000 men to succour the army of Italy. Here for the first time he made the acquaintance of Bonaparte. Although apparently their first meeting was far from being a case of love at first sight, a certain mutual esteem sprang up which was to end in hostility. Bonaparte remarked, "I have just seen a man of 26 or 27 years of age who wishes to appear 50, and from him I foresee no good to the republic." Whilst the other described his future Emperor as having "a French head and a Roman heart."

The two generals, however, although they thus early harboured feelings of personal antipathy, pretended to be on terms of close friendship. This may be accounted for in more than one way. Each man undoubtedly foresaw that the other would become a personage to be reckoned with in the future, and also, as the men of the two armies—of Italy and the Rhine—were extremely jealous of each other, the generals were too good soldiers not to smother their own feelings for the sake of setting an example to their subordinates. Napoleon, the Emperor, more or less followed this ideal throughout his career. Bernadotte, the marshal and prince, did not.

He commanded the advance guard at the passage of the Tagliamento; fought at Godroippo, Palma, Nora, and Gradisca, which fortress he, with the assistance of Serrurier, captured on the 17th March; and then pursued the Archduke Charles into Carniola and reached Laybach. At this time he was suspected of intriguing against France, and his papers were seized and sent to the Directory. Nothing was found in them against Bernadotte himself, but their examination deeply implicated Pichegru, and helped to bring about the coup d'état of the 18th Fructidor.[2]

The general then rejoined Bonaparte at Leoben, and, after the peace, was sent to Paris with the captured standards and a letter from his commander saying, "cet excellent general, qui a fait sa reputation sur les rives du Rhin, est aujourd'hui un des officiers les plus essentiels a la gloire de l'armee." Acting on this letter, the Directory appointed him commandant of Marseilles. But he rejoined Bonaparte at the château of Passeriano where he counselled that peace which was brought about by the treaty of Campo Formio. Bonaparte then returned to Paris with the draft of the treaty, and Bernadotte appears to have become apprehensive that his position at the capital might be undermined. He therefore applied for a post further afield, but was instead appointed commander-in-chief

[1] He is reported on one occasion when he could not get his men forward, to have torn off his epaulettes and hurled them into the midst of the enemy, and then springing forward, cried "Come on now and help me to recover them."

[2] Sept. 4th. The *coup d'état* of the Directory against the royalist reaction.

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in Italy. Scarcely had he taken up this post when he was sent as ambassador to Vienna, his business being to quiet the Austrian fears about the French schemes in Switzerland, and to try to undermine British influence in Central Europe. In choosing Bernadotte for this design the Directory selected the wrong man. In the field with sword in hand, Bernadotte was at this time all that could have been desired; in the cabinet he was a failure. In the present instance he fell out with the ministers over needless points of etiquette, and finally inflamed the populace by displaying the *tricouleur* over the embassy on a fête day. He then left Vienna and returned to Paris, where in August, 1798, he married Mlle. Desirée Clary, the daughter of a Marseilles lawyer and sister of Mme. Joseph Bonaparte.[1]

1799—1805:—

In November 1798, he was sent to the Rhine and captured Philipsburg, and next year was appointed minister of war. From a purely military point of view, Bernadotte was a success in this capacity. His organisation was excellent, and he understood the needs of the Army. The subordination of his post to politics, however, did not suit him, so after a quarrel with the directory, he retired to the country. He took no part in the coup d'état of the 18th Brumaire, neither on one side nor the other, but Bonaparte evidently believed that he could count on his support as he was appointed commander of the army of the west, when he put down the insurrections in that part of France, and on the 16th May 1800, he stopped the British landing at Quiberon. He resigned next year on account of ill health.

It was during his command in the west that Bernadotte became implicated in what is known as the Rennes Conspiracy. This was nothing less than an attempt to overthrow the power of Bonaparte, and Bernadotte and Moreau were suspected of being the ringleaders. Bernadotte, owing to the prospective expedition to San Domingo, had at this time 80,000 men under his command, and as these were mostly from the Rhine and knew not the first consul, it was not difficult for a clever commander to sow seeds of revolt amongst them. Whether Moreau was implicated or not cannot be proved, nor for that matter, can the absolute guilt of Bernadotte, for he was clever enough to be in Paris when the revolt broke out, and others took the blame and received the punishment. But although "not proven guilty" this affair made Bonaparte more suspicious than before of his loyalty, and it took the *kudos* of the victory at Quiberon to restore him to favour.

1805–6:—

In 1804, he was created a marshal, chief of the VIII cohort of the Legion of Honour and president of the electoral college of Vaucluse. This action on the Emperor's part may appear strange after his recent dissatisfaction, but the newly created marshal was too experienced a soldier to be passed over, and possibly Napoleon hoped to bind him to his side by what he considered unbreakable ties.

In 1805, he succeeded Mortier in command of the army in Hanover, and in the campaign which followed, he moved from there

[1] This lady had been the fiancée of Duphot, who was killed in Rome, and Napoleon himself is said to have wished to marry her at a previous time.

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to Würzburg, where, on the 25th September, he joined the Bavarians and took command of them. He then marched on Munich and entered the town on the 21st of October. He commanded the centre at Austerlitz, and after Soult had captured the Pratzen heights, he occupied the position and defended it for the remainder of the day against the heavy attacks by which the Russian reserve sought to recover the lost ground.

In June 1806, Bernadotte as a reward for his action, was created Prince of Ponte Corvo, and later, when hostilities broke out with Prussia, he was given command of the 1st Corps, which formed part of the centre column, and between the 8th and 13th October, made a march of 97 miles, during which, on the 9th., he defeated the Prussians under Tauenzein at Schleitz. It was on the day of Jena that Bernadotte for the first time signally failed as a general, when he failed to support Davout at Auerstädt. There is no space in this article to go into the arguments for and against his action in marching off to Dornberg and halting there, whilst his colleague engaged an enemy three times his strength, but even if one is inclined to admit that he obeyed the letter of the Emperor's instructions, there is no doubt that every other soldier of the empire who was a marshal at that date, would have risked the presumed disobedience and supported Davout in his unequal fight. It is understood that Napoleon's anger was great, but he contented himself with giving a slight reprimand in a letter written some days afterwards,[1] and Bernadotte's corps being fresh, he used it chiefly in the pursuit next day when the marshal made amends for his conduct on the 17th, by forcing Prince Eugène of Würtemberg out of a strong position at Halle and captured the town. This fight earned the ungrudging praise of the Emperor, who said that he himself would not have tried to force the position with less than 60.000 men. It is doubtful if the Prince of Würtemberg should have fought at all at Halle, but having decided to do so, his dispositions were greatly at fault. The position which he took up was on the right bank of the Saale, on the heights beyond the town of Halle. He also held the bridges over the river, which is here divided into three or four channels, and the main island in the stream. Bernadotte, arriving on the scene, decided to attack at once before any reinforcements could reach the Prussian commander. He therefore moved all he had of Dupont's division against the bridges, and Dupont followed the enemy through the town and occupied the far edge of it, where, shortly afterwards, he was joined by the remainder of his troops. As soon as Bernadotte had collected Rivaud's division he sent that up in support, and, in spite of a hot fire from sixty guns the French broke forward, stormed the heights, and breaking the Russian centre, separated the two wings from one another and from their alternate lines of retreat on Magdeburg or Berlin. They retired in disorder hotly pursued by the French, and the remnants did not unite again until they had passed the Elbe.

The Prince of Würtemberg had started the action with 12,000 infantry, 1,500 cavalry, and 60 guns. The Prince of Ponte Corvo, owing to having had to detach Drouet's division, attacked him with

[1] Mr. Loraine Petre is of the opinion that it was only the emperor's affection for Mme. Bernadotte that prevented him trying the marshal by court martial.

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an equal force of infantry, 1,000 cavalry and 12 guns, and destroyed 5,000 of the enemy with a loss to himself of 800. At the same time Drouet attacked and defeated the force under Triskow, which was marching to Würtemberg's assistance.

Admitting that the fight on the Prussian side was badly conceived and worse carried out, still all praise must be given to Bernadotte for not hesitating to attack such a position with the force in hand, when success would be of so great assistance to the general plan, and also, for the skill with which he first cut the enemy from his line of retreat and then broke his centre.

After crossing the Elbe he reached Brandenburg, on the 25th with two divisions, and next day captured a convoy on the Plaue Lake, north of Berlin. He then received orders to go in search of Blücher, and after two days got in touch with his cavalry. Then followed a series of advance guard actions until Soult began to make his presence felt, and doubling back before Murat the Prussian general shut himself in Lubeck. Bernadotte then captured a convoy and the North Gate, also some transports containing a Swedish force which was landing to support the Prussians. Bernadotte's troops sacked the city, but he was instrumental in saving the lives of the Swedes, and his bearing and kindness made such an impression on their officers that it was mainly through the efforts of their commander-in-chief that the Duke of Ponte Corvo found himself in later years heir to the throne of Sweden.[1]

Poland 1807:—

In the advance from Berlin to the Russian frontier, he crossed the Vistula at Thorn and formed the left wing of the army. After the Russian movement against Ney, he concentrated his divisions and overthrew Bennigsen's advanced troops at Mohrungen on the 25th of January, but then had to retire before superior numbers. Napoleon then formed the plan of using his corps as a decoy to lure the Russian general to destruction, but the Cossacks captured his despatch and Bennigsen escaped from the net. Bernadotte was not at Eylau, but on the 26th February he defeated the enemy at Spandau, when he was so badly wounded that he had to leave the army.

1808:—

Following the alliance of Fontainebleau between France and Denmark, the Danish Isles were occupied by French troops destined to act against Sweden. Bernadotte was in command of these, and having passed the Belt in March he found himself at the head of 32,000 French, Dutch, and Spanish troops in Zealand, a force which was afterwards reduced by the deflection of Romana and his 10,000 Spaniards who escaped to Spain. Although the movement did not bring about active hostilities Bernadotte arranged matters with diplomatic skill, and took pains to ingratiate himself with all concerned, for which he was to reap a great reward in after years.

The Danube, 1809:—

He was recalled from the Danish mission to take his place with

[1] Blücher got the blame for this sack. Firstly for using a neutral town as a refuge, and then for trying to defend it when it was incapable of defence.

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the grand army in Bavaria. In this campaign he commanded the 9th—the Saxon—Corps, but took no part in the earlier operations in Bavaria. During this period he circled round Bohemia, and picking up Dupas's division joined in in rear of the main advance at Passau. He was not employed at Aspern, but he found occasion afterwards to criticise the Emperor's dispositions, and unfortunately for him some kind friend repeated his censorious remarks within hearing of Napoleon himself.

On the eve of Wagram he moved his corps between those of Masséna and Oudinot, and directed himself on Raschdorf where he dislodged Nordmann, he arrived at 6 p.m., in front of Aderklaa. Soon after dawn next day the Archduke attacked this position and threw the Saxons into disorder. The duke of Ponte Corvo, galloping to the rear to get to the head of his fugitive corps and try and stop them, met the Emperor coming up. The latter, perhaps misunderstanding the true state of affairs, and seeing only a flying Corps with a marshal at their head, made some cutting remarks about "the scientific manœuvre by which he (Bernadotte) would have won the battle," and finished by ordering him off the field.

The marshal then returned to Paris. Having arrived there he had a stroke of fortune, for Clarke, the minister of war, was at the moment looking round amongst the unemployed leaders for someone to take command against the British expedition to Walcheren. Finding a tried warrior like Bernadotte at hand he sent him there, and the Prince accomplished his task in an able manner. At the same time his task was by no means a difficult one, and the self satisfaction which he enjoyed at concluding the campaign was hardly justified. For beyond capturing the weakly defended Flushing, Lord Chatham did practically nothing and before Bernadotte arrived on the scene King Louis, Bessières, Kellerman and Moncey, had all been taking steps for the defence of the country. Bernadotte, however claimed the credit, but in this he did not deceive the Emperor, who wrote to Fouche, ". . . . Without the cowardice of that wretch Monnet,[1] this expedition would have been dishonouring only for the English and would not have afforded them the shadow of glory. I am highly displeased with the prince of Ponte Corvo. The vanity of that man is excessive. I have ordered the war minister to recall him, his talent is very mediocre. I have no kind of faith in him. He lends a willing ear to all the intrigues which inundate the great capital. During war he is the same. He almost made me lose the battle of Jena; he behaved feebly at Wagram; he was not at Eylau although he might have been present; and he did not do all he might have done at Austerlitz . . . ."[2]

All of this shows that Napoleon had no further use for his marshal. The letter, true in substance is yet an exaggeration, for Bernadotte did actually receive orders too late to be of much use at Eylau, and he was made a prince for his conduct at Austerlitz. It must be admitted that the Emperor detracted from his gift in a letter to his brother Joseph written in May 1806, in which he said, ". . . . I will take care of Bernadotte . . . . You understand that in giving the

[1] General Monnet surrendered Flushing after a poor defence.

[2] Napoleon to Fouché from Schönbrunn, 11 Sept., 1809.

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title of duke and prince to Bernadotte it is through consideration for your wife, for there are several generals in my army who have served me better, and who are more devoted to me than he is. But I thought it better that the brother-in-law of the Queen of Naples should hold a distinguished rank."

1810—And after:—

It was at this time that took place the great change in Bernadotte's life. As a marshal of France his career was at an end, for even after his success at Walcheren it was not likely that Napoleon would employ him again, but fortune favoured him. The King of Sweden had no heir. The Prince of Holstein Augustberg, the accepted heir died in 1810, and the Swedish diet looked round for someone to take his place. Napoleon's choice, the King of Denmark, was unpopular in Sweden, and the name of Bernadotte was mentioned. He received support from such as possessed influence, who had known him in Lubeck in 1807, and in Zealand in the following year, and consequently was offered the heirdom of the crown. The Emperor accepted the decision, and lent his late marshal two million francs from the treasury, possibly foreseeing an increase to the dominion of France. At the same time he tried to bind Bernadotte to an alliance. "Promise me," he said, "that you will never fight against France." But the other would have none of it. "Sire" he replied "henceforward my whole duty shall be for the good of my country." "So be it," returned the Emperor, "We are all creatures of destiny."

So Marshal Bernadotte, Prince of Ponte Corvo arrived in Sweden in October 1810, and having abjured catholicism, was next month adopted by the Swedes as the hereditary Prince Charles John.

He may be said to have begun his reign almost at once, for the King was old and incapable of spending much time in affairs of state. And Bernadotte adapted himself readily to his new position, for which he has been praised. But it must be considered that if one is able enough to command an army at twenty-six one presumably increases sufficiently in wisdom to gather up the reins of government of a small state some twenty years later. He remained quietly in his adopted kingdom whilst the rest of Europe was plunged in war, and did not move politically until 1813 when he wrote to Napoleon saying he must break with him if the continental blockade were not removed. Now, having entered the arena, he went further and, in March, attempted to mediate between Napoleon and the allies but without result.

After Lützen he took 30,000 Swedes to Berlin, and advancing southwards with the Army of the North, he defeated his old subordinate Ney at Dennewitz. Then he joined in the general movement of the campaign and manœuvred skilfully at Leipzig; although even here we find traces of that dilatoriness of which the Emperor so often complained, when on the 18th he kept Langeron's Corps waiting for three hours before he reached his position on the Partha. His behaviour, however, appears to have given satisfaction to his new comrades in arms for after the battle he was publicly embraced by the Emperor of Russia, and the King of Prussia.

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The army which the crown prince of Sweden commanded in the campaign of next year is chiefly conspicuous for doing very little. It advanced very slowly from the north, in a manner in fact which would have aroused Napoleon's wrath in the old days, but which now he must have viewed with satisfaction for it did not embarrass him in the slightest degree. The explanation which some commentators give of this conduct is that Bernadotte was too much of a Frenchman to wish to take an active part in hostilities in his native land, which may be so, but it is difficult to reconcile it with his conduct at Dennewitz and Leipzig. A much more likely reason is that foreseeing the abdication of the Emperor, he had hopes of being chosen King in his place, and therefore wished to do nothing which would put the French soldiery and peasantry against him. He was disappointed but on Napoleon's abdication the kingdom of Norway was joined to that of Sweden which may have given him some solace.

Bernadotte. The King:—

In February 1818, the Kink of Sweden died of apoplexy and Bernadotte succeeded as Charles XIV. He was crowned at Stockholm on the 11th May, but his wife, who had remained a catholic, was not crowned till eleven years later. Except for some economic differences with the Norwegian parliament his reign as King must be considered an unqualified success. The commerce and public credit of the country increased rapidly and steadily, and he busied himself with the well-being of the people, the opening of the country districts and the development of agriculture. The canal of Gotha, which unites the Baltic with the North Sea, was carried out under his supervision.

His last years were embittered by disputes with his eldest son, who opposed many of the acts of his father, and also the strict system of court etiquette which the old King was careful to observe. Bernadotte was obsessed with this idea throughout his life. He had always been punctilious in small matters, and in many he carried it to excess. His failure as ambassador to Vienna was largely due to this, and in 1806, in the stress of warfare, we may read a despatch of his protesting against his following after Davout, on the plea that his was the I. Corps whereas Davout's was only the III.—a fatuous principle which was promply dissipated by the Emperor, who had no wish to see his schemes sacrificed to what he described as "useless points of etiquette of command."

Finally, having reached the ripe age of eighty, and deeply regretted by the whole country, he died at Stockholm on the 8th March 1844, leaving his crown to his said son Oscar, the Duke of Sudermania, who had married the daughter of Eugène Beauharnais and his wife, the princess Augusta of Bavaria.

From a worldly point of view Bernadotte was the most successful of all the marshals, as he was undoubtedly the most lucky. There is also a trait in his character which distinguishes him from his brother warriors, and that is a laziness of disposition which twice brought him to the verge of disaster. Yet one must admire him as a general. His tactics in the early revolutionary wars could always be relied on, as later could his handling of a large corps. And

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the fact that Napoleon, who distrusted him—even disliked him—should have continued to employ his as leader of some of his greatest *corps d'armees* is greater praise for the man than can be given in these pages. For the Emperor Napoleon did not employ inefficient commanders, even though socially he may have been interested in them or their families. Lefebvre, Junot, Dupont, and Victor—not to mention less known commanders—all suffered in turn. Bernadotte in spite of shortcomings was given two, if not three, chances. The theory of Napoleon's liking for the princess cannot be held to account wholly for this. The Emperor was greatly attached to Junot, whom he had raised from the ranks, and to his wife, whom he had known from childhood, yet he never made him, his favourite, a marshal, nor, after his failure at Vimiera, did he ever receive an independent command. The Duke of Ponte Corvo was placed on a different footing, and Napoleon's opinion of his ability as a general alone can account for this.

Bernadotte, the man, cannot be admired. Son of a petti-fogging lawyer, he seems to have had a mind always inclined to intrigue and guile. He was not above what is known as "giving away" his superiors for his own benefit, and more than one subordinate has complained that the Prince of Ponte Corvo would promise much and do little in his support.

When he became King with none above him, such traits faded into nothingness, and he left behind him the reputation of a wise ruler, who guided the destinies of his country through difficult times, and left her greater and richer than he had found her.

Conclusion:—

The courtesy of the Committee of the Royal Artillery Institution has permitted the publication of these sketches of the lives of the twelve chief marshals which have appeared in the pages of the "Journal." It is hoped that short lives of the remainder of the fighting marshals may shortly appear in book form.

In publishing these lives no claim is made that any new light has been thrown on the strategy or tactics of the time. They are merely intended to demonstrate the means by which these men, often lowly born, frequently of slight education and without wealth or influence, raised themselves to fill the commands which they finally held.

Most soldiers are interested in Napoleon's Marshals, but the study of their lives, of which these sketches is the result, was brought about by the adverse criticisms showered upon their actions by various military writers and army coaches, which made one wonder how men who apparently did nothing but make mistakes could ever have risen to hold such high commands. Perhaps these articles may explain it even if they do not explain away the mistakes which the marshals made.

We all acknowledge their errors, but it must be remembered that "he who has made no mistakes in war has seldom made war," and these men were fighting continuously from 1793 to 1815. That they were jealous is without doubt; that they ofttimes failed to help one another also cannot be denied. But one must remember that fourteen of them were of equal rank and the Emperor in issuing orders

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sometimes omitted to provide for who was to command. To rise from the ranks to the command of a great corps; to war for twenty years with all sorts and conditions of men, with all the elements of nature requires a character that will give way to nothing, and when two such persons differ in opinion one must expect the tug-of-war. They were a hard-headed, hard fighting, hard hearted race of men, who feared neither God nor any man but one, and allowance must be made for them in many cases which show a want of conciliation and agreement.

The Emperor Napoleon created twenty-seven marshals. Of these four were purely honorary appointments and one was a Pole. As regards the twenty-two others—if we include Macdonald and Masséna—we find a succession of generals of the highest order, drawn from one nation in the space of twenty years. And how many of their calibre did the rest of Europe produce to fight against them? We might count them on our fingers. Wellington, Moore, Suwarrow, the Archduke Charles, Kutusoff and Blücher, and of these Suwarrow was perhaps the only one who could have claimed that he was never out-manœuvred by a marshal of France, or defeated by his military dispositions alone.

Let it be granted that these men were the equals of the marshals —that some were their superiors, it is not claiming too much for Napoleon's commanders if we say that all of them were equal, and most of them superior to any other general who fought against them.

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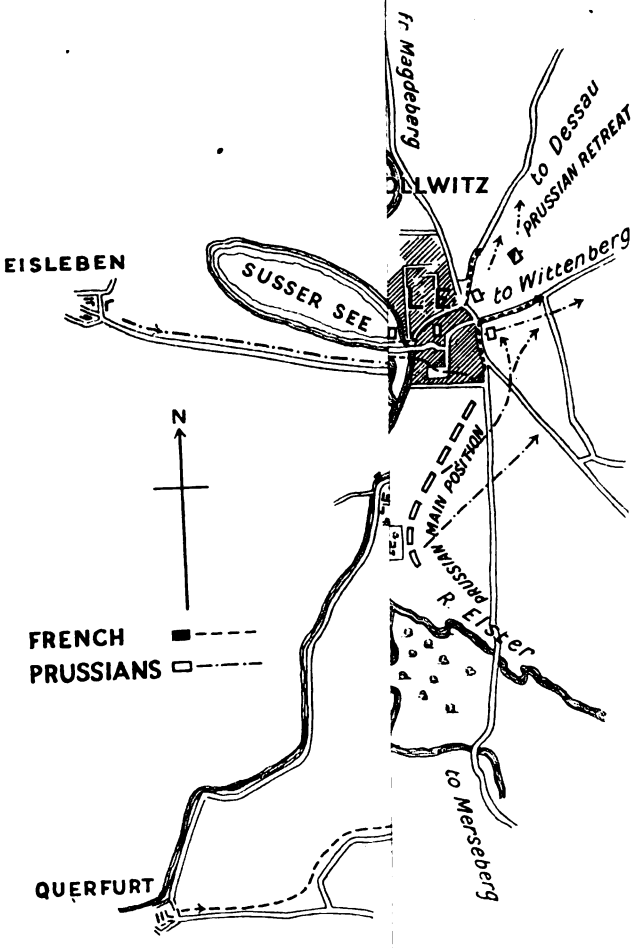

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The Italian Colony of Eritrea.

By LIEUTENANT J. F. de F. SHAW, R.G.A.

A few years ago I happened to be quartered at Aden, and finding that I could get five weeks leave at the end of trying hot weather I decided to go to Asmára, the hill station and seat of government of the above named colony, a brother subaltern having brought back glowing accounts of the place the year before.

Permission to enter the colony is necessary, but this is easily obtained through the Italian Consul at Aden.

The first part of the journey is made in a steamer of the "Florio Rubattino" line which leaves Aden weekly for Massowah. The boats are small but fairly comfortable. Massowah is reached on the third day from Aden, it is an important seaport town with a fine harbour and some good buildings and shops. It was at one time the capital. It possesses but little interest to the visitor, however, and as its temperature is normally several degrees higher than that of Aden it is advisable to get out of it as soon as possible.

The agent of the "Florio Rubattino" Company will make the necessary arrangements for the rest of the journey. A railway runs inland for 12 miles only to Mai Atal,[1] and from there one has the choice of proceeding by public diligence, private carriage (for which previous notice is required), or riding mule. The second method is to be recommended to the first as the "diligence" travels by night and is most horribly cramped and uncomfortable.

In any case Asmara can easily be reached in about 12 hours from Massowah by one of these methods. The road, recently improved by the engineers, is quite good, and in some places most picturesque with fine views in the distance.

A short sketch of the history of Eritrea may not be out of place before going any further.

The Italian interests date from 1883, when they effected a landing at Assab (nearly opposite Aden) and occupied Massowah and other ports on the coast. They steadily continued to gain territory, until in 1888, their influence on the coast reached from Ras Kasan to the Northern boundary of the French possession of Obok (vide map attached) in all about 650 miles. The interior limits, however, were badly defined, and King John of Abyssinia viewed the Italian advance towards his territory with anything but favour.

In January 1887, an Italian force met the Abyssinians at Dogali, and suffered a severe defeat. They still persevered, however, and eventually occupied and strengthened Asmara and Keren.

Meanwhile King John had died, and Menelik succeeded to the throne, and in May 1889, the treaty of Ucielli was concluded between Italy and Abyssinia. This agreement settled the boundary between the two territories, in terms implying mutual peace and friendship.

[1] Since this visit, the line has been extended to Ghinda (about half-way to Asmara).

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Italy, however, regarded this treaty as establishing a protectorate over Abyssinia, which view was not taken by King Menelik. Relations thus became unfriendly again, and in 1893, Menelik suddenly denounced the treaty of Ucielli.

Affairs grew from bad to worse and in 1895, both sides prepared to take the field, strong reinforcements of troops having arrived from Italy, and native levies been organised by the Italian commanders.

By the end of the year the Italians had advanced as far as Macalle, nearly the whole of the Tigre province being in their hands, but in December, 1895, they were forced to fall back on Adigrat.

Macalle was besieged by the Abyssinians and forced to capitulate in a month from starvation and thirst, the garrison being allowed to retire with all the honours of war, and to keep their arms on condition that they did not fight again.

At the end of February, Menelik was in a strong position at Adowa with nearly 90,000 men and modern quick-firing Hotchkiss guns. Many of his men carried breech-loading rifles of recent manufacture.

His general line of defence ran along elevated ground with good cover for men and guns and a clear field of fire in front, rendering the unseen approach of an enemy almost impossible.

Against this great strength General Baratieri, the Italian commander, with only 16,000 troops all told and 56 guns, advanced to the attack from the base at Sauria, 18 miles distant from Adowa, early on the morning of the 1st March. The force was in three columns, one directed against each of the enemy's flanks, and the third against his centre, a brigade being kept in reserve. It was the intention of General Baratieri, that the attack of the columns should be simultaneous, but the left column under General Albertone advanced too far (chiefly owing to a defective map) and became prematurely engaged with the enemy. At 6 a.m., the Abyssinians made a furious attack on this column, their superior Hotchkiss guns soon silencing the Italian mountain artillery. Their infantry then swarmed down on the column turning both flanks whilst selected marksmen picked off the few remaining gunners at the guns. After some hours gallant resistance, the remnant of the column surrendered, having used all their ammunition and suffered enormous losses, no assistance being forthcoming from the centre column as General Albertone had failed to keep in touch with it.

The enemy then turned their attention to the remaining columns, and after a desperate resistance these were compelled to retire in the face of vastly superior numbers and heavy losses, General Arimondi being amongst the killed.

At first the retreat was orderly, the Italians contesting every yard of ground, but the Abyssinian attack was so determined that a general rout soon ensued. The base camp at Sauria with all stores and munitions of war fell into the enemy's hands, and remnants of the defeated force struggled on into various strongholds over the border.

The Italian losses at Adowa have been given as 2,000 prisoners, 6,000 killed (including 261 officers, two of whom were generals), and 1,400 wounded, also the whole of their artillery, supplies and transport and some 11,000 rifles, nearly all the men having thrown away their arms as they fled. As the survivors reached Eritrea, the panic

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spread through the colony, and many of the colonists fled to the coast ports for safety.

The news of the disaster caused a great stir in Italy. Strong reinforcements of troops were sent out, the re-organisation of the defeated force was taken in hand at once, and General Baratieri was ordered to be court-martialled, the defeat being attributed mainly to his action. The court-martial was held at Asmara, and after a lengthy sitting he was acquitted on all the charges.

A fresh treaty at Addis Adeba was concluded in the same year, recognising the absolute independence of Abyssinia and finally fixing the boundaries between that country and Eritrea. Signor Ferdinando Martini was sent out as Governor and Massowah chosen as the capital, but being found unsuitable owing to its bad climate a move was soon made to Asmara.

Asmara does not at first strike the new-comer as being a place of any great pretensions. Most of the houses are of poor construction, but there are a few good buildings, notably the Government offices, the European barracks, and the two clubs, civil and military. The town is commanded on the S.W. side by Fort Baldissera, a large work practically impregnable, containing large supplies of ammunition and provisions housed in fire-proof store-rooms; and dotted round the town on the other sides are the various barracks of the native troops. These are not to be compared with the substantial and roomy buildings allotted to the Italian soldiers, being merely typical Abyssinian stone huts, circular in form with thatched roofs.

There are at the present time about 7,500 troops of all arms, European and native, stationed in Eritrea. These comprise 187 officers and 1,196 other ranks (Italian), and 57 officers with 5,400 other ranks (native).

The whole force is constituted as follows:—

Italian Troops.—3 companies of foot Chasseurs, 1 company of Carabineers, 1 section of Artillery artificers, 1 company of Engineers, 1 section of Engineer specialists.

Native Troops.—6 battalions infantry, 1 squadron cavalry, 2 mountain batteries, also some companies of fortress artillery; supply, transport and medical units.

A native infantry battalion now consists of 4 companies of about 200 of all ranks. Each company is divided into 3 "centurias" (or sections) and a (centuria into 2 "Buluks" (or squads). A captain commands the company with three subalterns (Italian) under him, and in addition he has two Native subalterns. ("Jus Bashi") the native sergeant in charge of each "Buluk" is called the "Buluk Bashi" and under him is the native corporal ("Muntaz").

A mountain battery consists of four Italian officers, eleven Italian N.C.O's or selected gunners, and 163 natives. The latter are mostly Sudanese, these being found the most suitable for artillery work.

The infantry (Ascari) are particularly efficient. They are all men of fine physique, mostly recruited from mountain districts, and in their loosely fitting white summer dress, tied at the waist with a crimson sash, and surmounted by a "fez" of the same colour, they look both smart and useful. They work barefooted, and are armed with the Mannlicher rifle and short bayonet; a waistbelt and cartridge pouch added completes their ordinary parade equipment.

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There were two other British officers on leave from Aden at Asmara when I arrived, and through them I made the acquaintance of some of the Italian officers. They were all extremely civil and kind to us, and made us honorary members of their club ("Circolo Ufficiale"), and also of the "Sports Club" where they used to meet in the afternoon for tennis, etc. Not one of them, however, could talk English, but all spoke French more or less fluently.

Officers for the Italian colonial service are appointed by the Minister of war, on the recommendation of the Governor of Eritrea. There appears to be no fixed period of service, and many of them had been there for years and gained valuable experience of the country and natives.

They all seemed to prefer the service to that of Italy, they say it is less strenuous and better paid. A subaltern of artillery in Eritrea draws about 200 lira (£9) a month; this does not sound an extravagant wage to our minds perhaps, but on the other hand compare their expenses with those of our service!

Every Italian officer messes by contract either at the Military Club or at a restaurant for an absurdly small sum; his uniform is inexpensive and obtained from Government firms at fixed rates, and he is supplied free of cost with saddlery, chargers, quarters and a host of smaller items too numerous to mention.

An officer of the Italian army who finds himself badly in debt can apply to the State for assistance. A Court of Inquiry is held on his case, and, if satisfied that the debts are not due to undue extravagance, the Court can recommend that the State pay off the whole of the amount owing, the money thus paid being recovered from the officer by small stoppages from his pay.

This practice is, it is believed, in vogue in most Continental armies, and its advantages need no comment.

I paid a call on the Governor of Eritrea (Signor Ferdinando Martini) soon after my arrival. He received me with great courtesy, and asked some questions about my journey, etc., and appeared to think it very enterprising of anyone coming to Asmara from Aden.

He had made himself very popular with all classes since taking over office, and had done much for the colony in the face of great difficulties. I also called on the officer commanding the troops (Colonel Giachetti) who was also very civil and asked me to attend a rifle meeting which was to be held on the following day. As the range was two miles distant he very kindly sent a horse for me. On arrival I found a large number of officers, civilians, and a few Italian soldiers assembled, and all entering for the various competitions with great keenness. The meeting was run on very similar lines to those of our service, except that the targets were all of the "bullseye" type. Some of the scores were very good.

A day or two later I saw some of the native infantry at drill and manœuvre. I have already described them as being a useful lot of men, but they should be seen at work in order to appreciate their full value. Their standard of drill is perhaps not high as compared with our Indian troops, but their manœuvring is excellent; in attacking a position on a steep ridge they made use of every scrap of available cover, and hardly a man or rifle was visible until the firing line was close up to the ridge for the final rush. The rank and file

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seemed to act to a great extent independently of their officers or N.C.O's., and consequently there was very little shouting of words of command, whistle sounds, etc. The Italian officers, especially those who have been any time in the colony, show great tact in managing the native soldier, and this quality is very necessary, for the Abyssinian, unlike most native races, is not to be driven to do things, a certain amount of kindness combined with firmness is necessary to get any work out of him. He is fairly intelligent as a rule, and, once having been shown what is required of him, will generally do it without giving any trouble. Their esprit de corps and loyalty to their officers is of a high order, and many instances of this have occurred in the various campaigns in which they have fought.

They are, in addition, naturally good shots and hunters, and make excellent scouts, and their marching powers are splendid, 26 English miles being an ordinary day's march for a regiment.

After the disaster at Adowa the native troops, (Abyssinians and natives of Eritrea) who had fought for the Italians and had been captured by the enemy, were treated with great cruelty. The council of war sentenced them (with Menelik's approval) to undergo mutilation by the cutting off of the right hand and left foot. This sentence was carried out on many hundreds of prisoners, the stumps afterwards being plunged into boiling fat to stop the hemorrhage and heal the wound. Many survived the operation and were eventually sent back to their homes.

While I was at Asmara a big "fete" took place and a programme of festivities lasting a week was arranged, including a ball, tennis tournament, fencing, etc., etc. The garrison was increased by a squadron of cavalry and a small party of sailors from a gunboat at Massowah, and we were invited to everything.

The ball was a most successful affair, though the ladies were very much in the minority, as might have been expected in an out-of-the-world place like Asmara. Married officers are not accepted for service in Eritrea, the only exception to the rule being the officer commanding the forces (Colonel Giachetti) who had his family at Asmara.

The "week" ended with a parade of troops before the Governor. About 2,000 of all arms paraded, comprising one native battalion, the cavalry squadron, one mountain battery, a company of fortress artillery, and two companies of chasseurs with the naval detachment.

This was the only time I saw any of their artillery, as the mountain battery stationed at Asmara was out in practice camp while I was there and only came in for the review. They are armed with a gun similar to our 2·5″ mountain gun, and possess some fine Italian mules.

"Ceremonial" is certainly not the Abyssinian soldier's strong point and the "present arms" with which the Governor was received was a most distressing sight, rifles being held at every conceivable angle. The troops marched past fairly well, however (the Ascari at the "double"), and looked well in their white summer clothing. The proceedings closed with a charge of the cavalry, after which a general movement for home was made.

The Italian native cavalry practically ceased to exist after the war of 1896, owing to the rinderpest scourge which killed off all the

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horses, but it has now been reformed on a greatly reduced establishment, only one squadron being provided for at present. There is really very little scope for cavalry in the colony owing to its mountainous nature, and the Italian police are now mounted on good riding mules, which are much more suitable than horses for the work.

I returned to Aden at the expiration of my leave after a most enjoyable trip, due almost entirely to the kindness shown me by the Italian officers.

Eritrea is still in its infancy, but should eventually prosper. The State now makes free offers of plots of land to colonists who undertake to cultivate it in the European way and not to sublet it to natives, and many Italians have taken advantage of this offer. The trade of the colony too shows signs of improvement.

Gold was discovered some years ago near Asmara, and its production may in time become the chief industry, although as yet only in the early stages of developement.

The greatest improvements have been made in the military organisation. At the time of Adowa, the Italians had little or no knowledge of colonial warfare; their native troops, though brave and loyal, were only partly trained, and the medical and supply departments were of a most primitive nature.

Now Eritrea possesses a sufficient force of highly trained men led by experienced officers; reliable maps have been prepared, good military roads have been made by the Engineers, and an excellent transport service organised.

Italy and England have both vast interests in this quarter of Africa in watching the movements of Abyssinia, who with her large army and ever increasing stock of modern rifles and ammunition tends to become a great menace.

The chief danger appears to lie in the French possession of Djibuti from the traffic of arms and ammunition through that quarter into Abyssinia, and this will continue until France will come to a friendly agreement with England and Italy on this point.

France, however, in her present position can use Abyssinia as an instrument against these two powers, so it may suit her policy to let affairs remain as they are.

In conclusion, I can recommend a trip to Eritrea to any readers of this "Journal" who may be quartered at Aden, and are desirous of availing themselves of a few weeks leave. As an alternative to staying the whole time at Asmara, where there is not much to interest the new comer after the first few days, a short tour through the colony might be made, to include Keren (the cavalry station), the battlefield of Adowa, and, if time and means admit, even as far as Kassala. There would always be a chance of a shot at a lion, so a suitable rifle should be taken, as well as a shot gun which might be useful, but there is no use in taking fishing rods and tackle.

Supplies, coolies, mules, etc., can all be obtained at Massowah, also servants, and guides if required; the agent of the Florio-Rubattino S.S. Company, would put one in the way of getting all the above. In any case, wherever the Englishman goes in Eritrea, I can guarantee that he will be received with kindness and hospitality by the Italians which he will always remember.

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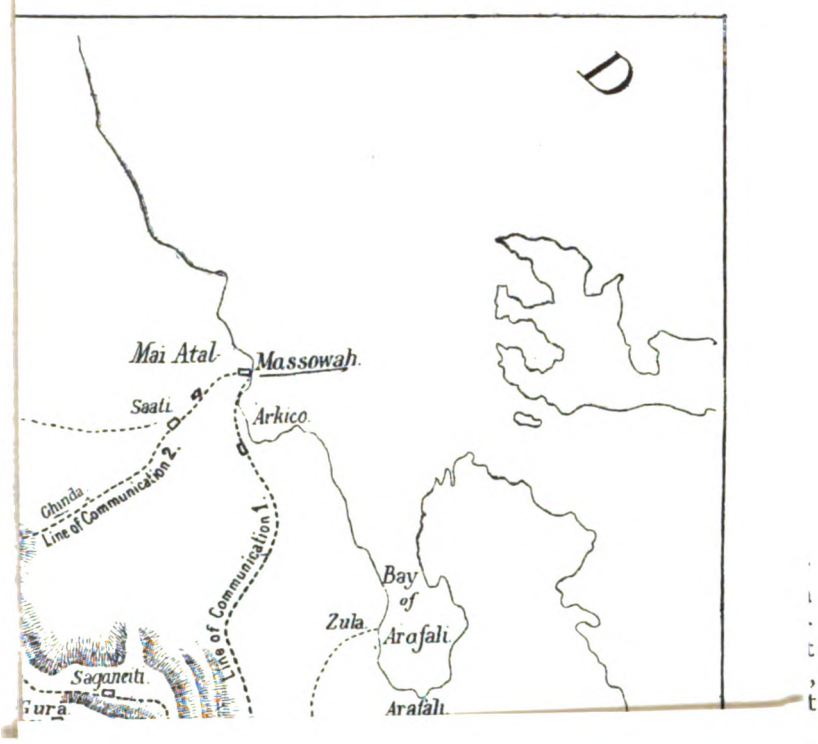

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THE CRIMEA REVISITED.

By MAJOR GENERAL H. T. ARBUTHNOT, C.B.

(A Lecture delivered at the Royal Artillery Institution, Thursday, 3rd November, 1910).

Major General H. E. Belfield, C.B., D.S.O., (Commanding the Fourth Division), in the Chair.

THE CHAIRMAN: Ladies and Gentlemen, it generally falls to the lot of the Chairman on an occasion of this kind to open the proceeding with certain remarks, usually of an intensely vapid nature, in introducing the Lecturer to his audience. These are generally extremely perfunctory, but I cannot conceive that they have ever been more perfunctory than they are to-day, when I find myself on my legs—never hoping to be a member of this Institution—to introduce to you one of your oldest and most respected members. But still so it is, and so formally I introduce to you General Arbuthnot, who has kindly come here to-day to lecture to us on the subject of The Crimea Re-visited.

MAJOR GENERAL ARBUTHNOT: General Belfield, Sir Robert Biddulph, ladies and gentlemen, I obtained my commission as Second Lieutenant in the Royal Artillery, in June, 1853; I joined at Woolwich in the following August and was posted to No. 8 Company, 3rd Battalion, then second on the roster for foreign service. Shortly after joining we were placed under orders for Ceylon, but towards the end of the year 1853, it became evident that we should have to send an Expeditionary force to the East, and early in 1854, four, five or six of the leading companies for foreign service were converted into field batteries and ammunition columns, and put under orders for the East. I am not going to enter into the organisation of the Regiment at that time, except to say that a company could be a Garrison Company one day and a Field Battery the next, and where we got our horses and drivers from I do not remember. But we were very soon licked into shape and embarked at Woolwich for the East on the 29th March, 1854.

It took three sailing ships in those days to take out one battery. The strength of the battery was six officers, including a doctor—every battery had its own medical man—181 non-commissioned officers and men, nine artificers, two trumpeters, and 182 horses. The armament consisted of four 9-pounder brass guns, and two 24-pounder brass howitzers; and to show what very little advance had been made in artillery during the forty years of peace after the Peninsular War, the very guns we took out had actually been engaged at

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Waterloo. The only difference I know of that had taken place between Waterloo and the Crimea, was the introduction of tubes for firing the gun, instead of priming with loose powder out of the powder horn.

We arrived at the Bosphorus on the 6th May, disembarked at Scutari on the 8th May; we were quartered in barracks near a village called Coolali, a large square building four sides of a square, with a very large barrack-yard in the middle, which accommodated other troops and batteries besides our battery. I remember nothing remarkable about the barracks except its extreme filth and the extraordinary quantity of fleas; I assure you there was not a square inch in anyone's body that was not touched up by the flea. Therefore, we were very glad when after about ten days we went into camp rather more inland, close to a cypress grove where we got plenty of shade, and a very pleasant camp it was. We remained there about six weeks, and in the middle of June, the Army was moved up from those parts to Bulgaria. The First Division was encamped just outside Varna, the Light Division about a day's march inland, and the Second Division was still further inland, near Pravadi, and the cavalry and horse artillery were still further to the left. The French Army, and third Division of the English Army, remained at Gallipoli, the object being that, if the Russians had taken the forts on the Danube, we should have fallen back to defend the passes of the Balkans, and then if they forced the Balkans the French would have been on their flank.

We remained in Bulgaria about two months, and a very monotonous time it was doing nothing; we were very glad when we received orders to march to Varna to embark for the Crimea. We embarked on the 20th August and sailed about in the Black Sea for three weeks, I suppose whilst the commanders were making up their minds where to land, and eventually the landing commenced on the 14th September. Then a storm sprang up which prevented the horses being landed, and the Field Artillery was landed on the 17th September. The landing was completed on the 18th, and on the 19th the march towards Sevastopol commenced.

I should like to say a few words as to what took me out to the Crimea this last spring. Colonel Jocelyn, whom as I daresay many of you know, is engaged in writing the history of the Regiment from the year 1853, where Colonel Hime left it, to 1863; this takes in the period embraced by the Crimean War and the Indian Mutiny. I am extremely sorry Colonel Jocelyn is unable to be here to-night—he fully intended coming—because he knows more about this subject than most people, through what he has been doing; but he has met with a very severe accident—he only came out of a Surgical Home two days ago—and he is quite unable to be present to-night. As I happened to be one of the very few surviving Artillery officers who went through the whole of the Crimean war, I was able to give Colonel Jocelyn a good deal of information; and I am very pleased to see my old friend Sir Robert Biddulph here to-day, who is also one of the survivors of that war, and who also went through the whole of it. (Applause). I said to him one day: "If you want to know all about it you should go out to the Crimea

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yourself and look at the battlefields." The idea struck him as a good one, but he was afraid he could not manage it, but if he could he would. Meantime he asked me to make enquiries, which I did. I put myself in communication with General Yermoloff, the Russian Military Attaché in London, who took the very greatest interest in my idea of going out there. He wrote to the authorities at St. Petersburg, and the Governor in the Crimea was instructed to afford me every facility, and to make my visit as pleasant for me as he could. Towards the middle of March Colonel Jocelyn told me he could not possibly go. I had gone too far to draw back, and I thought I should have to go out by myself; but just about that time my son came home from India on leave, and he agreed to go with me, and he was of very great assistance to me because he took all the photographs that you will see on the screen.

The journey out there was very simple. We took the steamer from Marseilles to Constantinople, and at Constantinople there is a Russian steamer that goes once a week direct to Sevastopol. Before leaving London, General Yermoloff asked me what hotel I was going to stay at, at Constantinople, in case he wanted to communicate with me. I had not been at the hotel an hour before an officer from the Russian Embassy at Constantinople called upon me, and said he was deputed by the Russian Ambassador to see if he could be of any assistance to me whilst I was at Constantinople. That was the first of many acts of courtesy that I met with from the Russians during my visit. I daresay some of you may know Major Tyrrell, our Military Attaché at Constantinople; he is a gunner. He called upon me and took us over to Scutari. The first thing I did was to go and see the barracks at Coolali. They are exactly as we left them 56 years ago; there is nothing odd in that; but I did not go into them, because I had not the smallest wish to renew my acquaintance with those fleas. (Laughter). I saw the place where we encamped by the cypress grove, and then I went to the English cemetery, which is a new one of course since those days. It is a beautifully kept cemetery; it is in charge of a retired Sergeant of Engineers, and nothing could be nicer than the way it is kept. There is a monument erected there to the memory of those who fell. On the four faces of the monument the inscription is written in the four languages of the Allies, English, French, Turkish, and Sardinian, and this was the inscription:—"To the memory of the Officers and Men and of the sailors of the English Army and fleet who died for their country in the war against Russia 1854, 1855, 1856. This Monument was erected by Queen Victoria and Her people 1857."

I did not stay more than three days at Constantinople, and on arrival at the Crimea we were met on landing by the British Consul, and on the following day, quite early in the morning, Captain Dobrovolski called upon me to say that he was deputed by the Governor of the Crimea to wait upon me, and to put himself entirely at my disposal to take me anywhere I wanted to go, and to show me anything I wanted to see. He said I was not to feel bound to him, that I might go about myself and take any photographs I liked; they gave me a perfectly free hand; there was not the smallest espionage whatever; I could do anything I liked, and go anywhere

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that I liked. He asked me what I should like to do that first day. I said that first of all I wished to call upon the Authorities to leave my card and make myself known to them. He said, "Oh you had better not do that to-day—do it to-morrow." I could not understand his object then, but I found out afterwards that his reason was that he might apprise all the Authorities of my intended visit so that I might be properly received. That day he suggested going to the museum of Crimean relics. The whole of the battlefields and everything connected with the war are in charge of the Grand Duke Alexander Michaelovich. He wired to his chamberlain Gordinsky, which telegram was shown to me, to put himself at my disposal also, and to give me every facility, and to make my visit as pleasant as he could. We went to the Museum which was very interesting; it contained nothing except things appertaining to the war. Photographs of the Generals engaged on both sides, models of the ships and guns, and things picked up off the battlefield; in fact it is very interesting as a memento of the war.

In the afternoon Gordinski suggested that he should take us round the lines of Sevastopol as they were in the years 1854 and 1855. I ought to mention that the Russians had intended to have a Jubilee of the war in 1904, for they are just as proud of the defence that they made as we are of our efforts to take the place. That Jubilee, however, was knocked on the head by the Japanese war; but in view of that Jubilee they re-constructed the fortifications of Sevastopol exactly as they were in 1855.

A Russian regiment I may say is more like an English brigade. It consists of four battalions, and there is one Colonel over the whole of the four, similar to our Brigadier; and each battalion has its own Colonel. Each regiment in Sevastopol had its allotted place in the defence, and now where each regiment was responsible for the defence of the place a brass tablet has been let into the parapet of that part of the line, showing the name of the regiment; the regiment that is now at Sevastopol is one of those that was engaged in that war.

We began on the extreme left of the Russian position, which rested on the head of the harbour, and went straight along the lines as far as the flag staff battery, which was on the English extreme left and the French extreme right. We went to the Malakoff and to the Redan, and in front of the Malakoff a line of stones coloured red is placed to show how near the French were to the place they attacked before the final assault. The French were extremely close to the Malakoff, I had no notion they were so close, before they finally attacked it. The English were not quite so near the Redan as the French were to the Malakoff.

The Flag-staff Battery has been restored and is now exactly as it was in 1854-55. The photo shows plainly, the gabions and fascines. You can see the inside with sand bags on the top and gabions inside. Close to this bastion du Mât is what they call the Boulevard Historique; I do not know why it is called so, and there is a public tea-garden there. After we had completed the visit to the Russian lines we came to this Boulevard where in advance Gordinski had ordered a very sumptuous tea to be provided for us,

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Flag Staff Battery, Sevastopol.—Restored 1904.

and after tea when we thought it was time to go away, Gordinski ordered another repast of champagne and so forth. Gordinski proposed every possible toast he could think of. He began of course, by proposing my health, then my son's health, then Captain Dobrovolski's. Then he proposed the married officers, then the unmarried officers, and so on till I thought he was never going to end.

The next day began the visits of ceremony. I first called on the acting Governor—the real Governor was away on leave for a few days. Then I went to the Commandant of Artillery; then I went to the Commandant of the Garrison of Sevastopol, who is an extremely pleasant man. He produced a bottle of Crimean wine which was made in the year of the war—it was the last bottle he had in his cellar—(it was a very great honour to me) which we drank, and then he produced a bottle of more modern wine. You cannot do anything in Russia without drinking wine. Then he said to me, "would you like to see a Russian barrack"? I said: "Yes, I would very much"—so he said he would send carriages to take us round and show us a Russian barrack the next day. Then in the afternoon we went to call upon the Admiral. The Admiral sent his steam launch to the landing stage to take us off to the Flagship, and when we got to the ship the Admiral met us on the top of the companion ladder with the Flag Captain. The whole of the ship's crew were mustered on the Quarter deck, the guard presented arms and all saluted. If I had been a Prince I could not have been more royally received. We were shown all over the ship, not a single thing was kept from us. The Admiral said: "Of course this is nothing to you; our ships cannot compare with your's we know—but I thought, perhaps you would like to see what our ships are like." Then the Admiral took us to his cabin, where we had tea. Then, when we were just going, the commander of the ship brought word that all the officers would be glad if we would honour them by going to see them in the ward-room so we went down and found another re-

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past spread for us, with champagne as usual. We stayed there a considerable time, and when we came away we thought we were going straight back to the landing stage. But no: the steam launch took us round the whole of the Black Sea fleet—there were seven ships altogether—we went round each ship, and as we passed each ship the same ceremony was gone through, the whole of the ship's crew was mustered on deck, the officers saluted and the guard presented arms. It was really a most magnificent reception. I want to say this. I do not for one instant wish it to be inferred or to imply that I think these attentions were personal to myself; it was simply the extreme pleasure that the Russian Army and Navy feel at the *entente* that has sprung up between the two countries, and they made no concealment of their hope and wish that this *entente* will eventually develop into an alliance.

Then the next day we went to the Russian barrack of the Bialostok Regiment. The General sent two carriages to fetch us from the hotel, and we drove straight to the barrack where we were received by the General himself and the Colonel of the regiment, who as I said before, is like our Brigadier, in command of four battalions. I daresay some of you have read the Russian account in the "Leaflet" of October describing our visit, and therefore I need not repeat it. It is quite a correct version of our visit to those barracks. There is one remark I should like to make with regard to it, and that is with regard to the Russian kitchen. I do not know whether I am right, I have not been round barracks for some years now, but the Russian kitchen to my mind is infinitely superior to anything I have ever seen in our army. Whether our field kitchens are as good now as the Russian are I am not prepared to say, I doubt whether they are because I saw in the paper two months ago that they were trying the Russian field kitchen at Aldershot with some improvements. I was very glad indeed to see that our authorities were trying to copy the Russian field kitchen, which I thought was admirable. And I hope that anybody who is going to Aldershot will look and see whether it is not an improvement upon anything we have in our army at present. I hope it may be introduced.

Then, after the feasting was all over on that occasion, there was a photograph taken of all of the officers of that regiment, and as many men as could be got into the photograph, besides their guests, and this inscription, which is in Russian, written at the bottom of the picture—"To Major General Arbuthnot—from the officers of the 50th Bialostok regiment as a memento of the 9/22 22nd April, 1910. Commanding the regiment Sevastopol, Colonel Liakhoff."

The visit to these barracks finished the ceremonial part of our sojourn in the Crimea.

The next day the Admiral having lent us his motor, we went to the Alma, and I tried to fix the spot where my battery had been in action at the battle 56 years ago, but the place is very much altered. The village of Bouliouk was burnt by the Russians at that time, to the right of which we formed and came into action. We were not in action very long before we were asked to move, partly because we were firing over the French left, which unsteadied their men, and partly on account of the smoke from the burning

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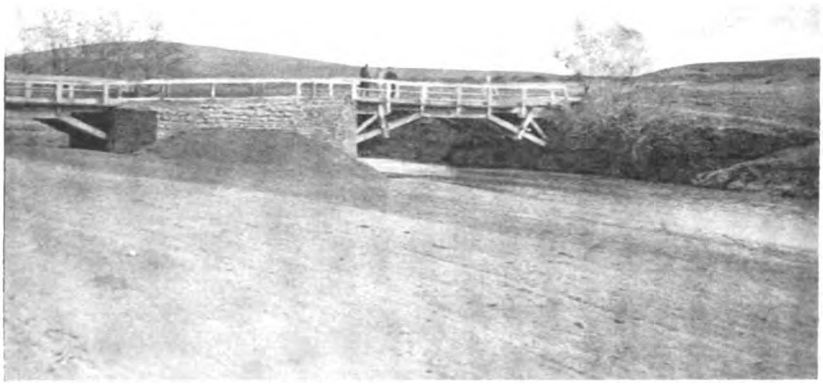

Bridge over the Alma near Bourliouk Village.

village which obstructed our view, so we went further to the left, and I cannot fix the exact spot; but the general feature of the ground is naturally unaltered; there is the grand redoubt, which mounted 18 guns of far heavier calibre than the guns we had against them. I went to that redoubt. It is a splendid position with sloping ground straight down from the redoubt to the river, with a vineyard at the bottom of it. It was up that slope that the 23rd Fusiliers, supported by the 95th regiment, assaulted that redoubt and took it—a magnificent feat of arms because it looks an almost impregnable position But those two regiments were terribly cut up, as you may see. The 23rd lost nine officers killed and six wounded—the 95th lost six officers killed and nine wounded—they both lost fifteen officers. The 23rd Fusiliers took a Russian gun with its horses; that gun is now at the Depôt of the 23rd at Wrexham, and the commanding officer of the Depôt sent me a photograph of the Russian gun taken at the Alma.

The next day we went to Balaklava. It is an extremely pretty little spot now, so different from what it was when I last saw it. Then it was crowded with ships and was all confusion and bustle; now it is a peaceful little place, as pretty as you could ever wish to see. The peculiarity of Balaklava harbour, however, is its extreme depth; right up to the wharf is practically deep and any large ship almost could float in that harbour. It was always crowded with shipping, and it is not really a very small harbour, but it is very difficult to enter because of the very narrow entrance to it. We drove from Sevastopol to Balaklava, and on the way we stopped at Lord Raglan's head-quarters. He had a very good farmhouse as his head-quarters, and it is still in existence; I suppose it has been renovated otherwise it is just the same as it was in those days; and in the room Lord Raglan died, there is a brass tablet let into the wall with this inscription: "In this room died Field Marshal Lord Raglan, G.C.B., Commander-in-Chief of the British Army in the Crimea on the 28th

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June, 1855."—and in the garden a stone tablet is erected: "To the memory of Field Marshal Lord Raglan, G.C.B., Commander-in-Chief of the British Army in the Crimea, died 28th June 1855."

Then we went on to see the battlefields of the battle of Balaklava. The line of the Turkish redoubt is unmistakable; you can trace every redoubt just as it was in those days, the highest of which went by the name of the No. 1 Redoubt. I do not quite know why, I daresay Sir Robert Biddulph can tell you because he knows much more about Balaklava than I do; he was there and I was not. Then the celebrated Light Cavalry charge was over a splendid piece of ground, as level as a billiard table, and a beautiful piece of green turf now it is; it was put up for hay when we were there, it is splendid galloping ground—I can quite imagine what valour the Light Cavalry Brigade showed in charging over that piece of ground.

Then the next day was to me the most interesting day of the whole of my visit. The object of the Russians in attacking us at the battle of Inkermann was to drive back our right flank and to drive us back to the sea, to Balaklava, and with that object they brought on a large force from the Mackenzie heights, crossing a little bridge over the Tchernaya, coming up the quarry ravine and attacking us on our right flank. Another force was to come up to attack our centre, and another force was to come up to attack our left flank, and another force was to come up to cut us off from the French, and also to give more ground for their army to deploy. The Second Division was on the extreme right of the Allied Army.

In the "Leaflet," mentioned before, you will see it is said that I fired the first shot at Sevastopol. That is not strictly accurate because the very first shot fired at Sevastopol was fired by the siege train, not by a field battery. But I did fire the first shot at the battle of Inkermann, and it came about in this way. On the 26th October, the Russians made a reconnaissance in force, evidently to see what our defences were on the right position of our army. When they attacked us at Inkermann they got their guns in position on Shell Hill where we had our advanced picket, which was very soon driven in. But after the 20th October, that picket was strengthened in the day time by two guns. The army always paraded an hour before daylight in those days, and on the day of the battle it happened to be my turn for duty, and when the parade was dismissed I was marching off with my two guns to join the picket on Shell Hill. It was a very foggy morning and there is very thick bushwood all over that ground. I had not got very far before I heard firing in the direction of Shell Hill. I knew by that that our pickets were being attacked. I hesitated for a moment whether to go on to assist the pickets, or in fact what to do, but by the sound of the firing rapidly getting nearer and nearer to me I knew that our picket was being driven in; so, instead of going forward, I trotted back and brought my guns behind the breastwork where it was always intended that the guns should be in case of attack, and knowing the distance I opened fire at once, without seeing my enemy, on the Russian artillery on Shell Hill, and in that way I fired the first gun at Inkermann, and I believe it was my gun that roused the camp and let them know the seriousness of the attack. (Applause).

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The Breastwork, Inkermann (exterior).

When I went to visit the field of battle I wanted to judge for myself the nature of the Russian attack, and as the force that came up the quarry ravine was the one that attacked the Second Division, I thought I would walk up the ravine, and get on to the plateau on that side to see what the effect was. So we took a boat at the harbour and sailed round to the Tchernaya and up the Tchernaya as far as the bridge, where we got out and walked up the quarry ravine. Where the track up the quarry ravine joins the main post road to Sevastopol a barrier was thrown across made of loose stones, which have evidently been taken away to mend the road, and there are no traces of that barrier left, in fact I did not expect to find many traces of any sort, but I said to my companions: "If my memory serves me rightly and if it is still in existence, if we walk on about 700 yards, we shall come to a breastwork thrown up about 200 yards in front of the Second Division camp, where it was settled that the guns should come into action in case of a serious attack." We walked back about 700 yards, and to my extreme delight there was that breastwork in existence now just as we left it 56 years ago. Of course, it is washed down a bit by the rain but unmistakably there is that very breastwork, and when I got to that breastwork the whole thing came back to me in a flash just as if it had only happened a couple of years ago. It was behind that breastwork that my battery was in action from 6.30 in the morning to 2.30 in the afternoon without ever moving. We were pounded at the whole time by the Russians on Shell Hill, and lost 49 horses and 22 men killed and wounded, a pretty hot day's work for one battery. We fired over 800 rounds of ammunition.

I said to my companions: "my memory has not played me false with regard to this breastwork. If I am right you can go in a certain direction"—which I pointed out—"and you ought to come upon the remains of the sand-bag battery. It was erected because when

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we first took up our position before Sevastopol, the Second Division's outlying pickets overlooked the harbour and the whole of the Tchernaya valley. On the banks of the river they saw a good deal of meadow hay, stacked, which was very valuable forage for the horses, so a foraging party was organised to go and fetch as much hay as it could. When the Russians saw that, they brought two guns on the opposite side of old Inkerman to fire on our foraging parties to prevent our getting the hay; whereupon Sir DeLacy Evans, who was commanding the Second Division, asked if he might have two guns lent him to silence the Russian guns, so that we might go on getting the hay. There was really no necessity for a battery. However, this battery was constructed, the ground was very rocky, the earth was very shallow, and it would have been a terrible labour to have built a battery in the ordinary way, digging a trench and throwing up the earth for a parapet, and so it was made entirely of sand-bags, and that gave it the name of the sand-bag battery. Sir Edwin Markham, who was then a brother subaltern with me, got the guns from the siege train, two 18-prs, and the proper amount of shot, shell, powder and so forth; and on the following day it was my turn for duty and I had to fight those guns. I had very little difficulty in silencing the Russian guns; but I noticed that after they had fired their shot the gunners ran down the rock and into a building cut in the face of the rock. I thought that was a sneaking thing to do, and I would have them out of that building, so I layed my gun on the building into which they retreated, and the very first shot went bang through the door—it was a marvellous shot. I say and I always shall say that the Devil layed that gun for me, and I will tell you why—The shot had no sooner gone through the door than out rushed the gunners up the cliff again followed by a priest. I then found I had been firing at a church, but it was not I who desecrated the church; it was the able-bodied men who took refuge in it which they had no business to do. But now for the sequel of it. The other day I went to look at that little church, it is still there. I thought I only fired one shot into it, but apparently I fired two because there are two shot now on two pillars at the entrance to the chancel. The shot had been blessed by the priest as having been fired into a sacred edifice without doing it any harm. When the priest heard that I was the man who fired those shot he did not bear me any ill will at all, he was only too delighted to make my acquaintance. It is not the same priest now as it was then; still he was very pleased to see me. I was very glad to have my story confirmed in that practical way, because sometimes people are apt, when you tell them of what you have done, to think you are telling travellers tales; but the very fact of those shot being there shows that what I tell you is perfectly true.

After having visited that breastwork and the sand-bag battery, two points as familiar to me as Woolwich Common, we walked along a very good road constructed with a view of the intended Jubilee, from Homeridge, where my battery was in action, right up to Shell Hill where the Russian artillery was; and on the top of that Shell Hill the Russians have erected a memorial to those who fell at Inkermann, and the English memorial is close by.

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There is one episode with regard to the battle of the Alma that I forgot to mention; it is very interesting to me if not to you. When we started on our march on the 19th September, we took three days' provisions in our haversacks, and we took it in turns to have our provisions cooked. On the day of the Alma it was my turn to have my bit of salt pork cooked, and after it was boiled and I was cutting it up out fell a bullet. That bit of salt pork (it was as hard as this table) was sufficiently tough to prevent that bullet going through it, and I would sooner have had the bullet in the salt pork than in my body. I have got that bullet to this day.

When the battle of Inkermann was over, we did not get back to camp until about 3 o'clock. I had to go into Balaklava to refit ammunition because we had fired 800 rounds and we had hardly any ammunition left. I found that every ship had been sent out of the harbour except the men-of-war, because the Admiral there thought from the account that came down from the front that we were driven back, and that he would probably have to embark the army; so in order to leave him plenty of room every ship had been sent outside to the Black Sea. When I got down I went to the Admiral and told him how imperative it was that I should have ammunition, and he gave me a man-of-war boat and we rowed out to the Black Sea to get ammunition from the ship that had it on board. That, of course, took time, and by the time we got back to camp (I do not remember the time it was, but it cannot have been far off midnight) I was dead-beat, my men were dead-beat, and the horses were more than dead-beat; so as soon as I saw the horses put up I went to my tent, I carried my lantern, and I saw a piece of paper pinned on to my pillow. I had a sort of instinct what it was so I did not look at it. I turned the pillow over and put the piece of paper underneath. Next morning I met my Commanding Officer Penycuick by name, a very good fellow indeed—he and I got on remarkably well—and he said to me, "Hullo, how is it you are not on picket"? I said: "Picket! What do you mean"? He said, "did you not see the orders pinned on to your pillow," "Oh" I said, "I saw a piece of paper, but I did not know what it was—I did not read it. I went to bed." He said: "Well you are a cool fellow, I must say"—and that is all I heard of my disobedience of orders—not going on picket that night. I could not have gone, we were all too dead beat.

Another day I went over the whole of the English attack. I may say that after Inkermann we walked back to Sevastopol, and passed where the siege train park used to be, of course there is no sign left, but we saw signs of the different camps, and I could pick out the Second Division camp which was mine, absolutely every regiment; and the Light Division camp was almost as distinct; but the most distinct of all was the Fourth Division—I do not know why, I think perhaps they had less fighting, and there was more time to make themselves comfortable; but you could see lines of stones for foot paths put down between the rows of tents. It was very muddy, and we were glad to keep ourselves dry by raising the ground with stones, and in many places you could see a row of holes dug out to make the bell tents more habitable. The walls of the bell tents in those days were not so high as they are now—there was very little standing

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room, and it was the fashion to dig out the ground and throw the earth outside to protect against wet and to give you more standing room. When I first came across a row of these holes I could not think what they were until somebody said: "surely these must be rifle-pits. "No," I said, "that is most absurd; there are no rifle-pits in the middle of a camp." Then it struck me of a sudden what it was—that all these were holes where the tents were, left as they were 56 years ago—not filled up a bit.

Then we went over the whole of the ground of attack, beginning with the French at the Mamelon. You could trace the parallels, the zig-zags up to the Mamelon perfectly, and on from the Mamelon to the Malakoff. And the same with the English attack; but our advance batteries are not so easy to find, because the ground there is very stony, and there is an immense deal of quarrying going on; all the stones for the buildings at Sevastopol are brought away from the Inkermann heights, and therefore the signs of the siege are obliterated where there is quarrying, but the parallels are perfectly distinct. There was one long parallel that connected the English right attack with the English left attack; it goes down one side of the ravine and up on to the other from Gordon's battery to Chapman's battery. That parallel is as distinct as if it was only made two years ago, and it is very remarkable how very little effect the climate seems to have had in obliterating the traces of this siege.

The Redan ought never to have been attacked in force as it was, because it is commanded both by the Malakoff and by the Flag-staff battery; if either the Flag-staff battery or the Malakoff was taken the Redan would have been untenable. And again I say it is so easy to be wise after the event; but if the attack had been concentrated on the Flag-staff battery and not on the Redan we should have captured the Flag-staff battery, and the Russians would have had to evacuate the Redan without that terrible loss that there was in trying to take it. As it was, because the French had the Malakoff and held it that made the Russians abandon their positions and retreat, because they knew (if we did not) they could no longer have held the Redan with the French in possession of the Malakoff. By that means the Redan was gone and the Malakoff taken, their defences were pierced and they could not hold out longer. Therefore, it was quite unnecessary to waste so much blood in trying to capture the Redan.

The town of Sevastopol in which we were is now an extremely pleasant town, very well built and very well kept, quite clean, with wide streets and good shops. There is not much trade with the Crimea, but they are anxious to have a commercial harbour as well as a military harbour. No merchant ships go into the harbour of Sevastopol, or very few, so they are trying to make a commercial harbour close by, something like Portsmouth is our military harbour, and our civil harbour one may say, I suppose, is Southampton.

I do not think I have much more to say about this siege; but after visiting all these places which had a great interest to me, we went to the English cemetery on Cathcart Hill. It is beautifully kept; it is just as well kept as the one at Scutari. A German gardener is in charge of it, and his heart is absolutely in his work; he works

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there from morning to night to keep it nice and tidy. It is quite a pleasant spot to visit.

This is a photograph of the Royal Artillery Monument which was erected by the officers serving in the East in the year 1856.

R.A. Memorial, Cathcart's Hill.

It reads, " Sacred to the memory of the officers, non-commissioned officers and men of the Royal Artillery, who were killed in action or have died during the Eastern Campaign. This Monument is erected by the officers of the Regiment serving in the Crimea, A.D. 1854." Then the names of the officers and privates are on the four sides, 26 officers killed or died, and 1,460 men. You see how it is tumbling to pieces, and you can see how it has been patched up here, there, and everywhere, and how it is gradually tumbling down. It is made of soft Inkermann stone.

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The Royal Engineers had a similar monument to this and they have replaced it by a very handsome monument of marble. I want to do the same for the Royal Artillery. Their monument was tumbling to pieces just as ours is, and they, with their esprit de corps, have had this monument made in England and sent out to be erected in the cemetery at a cost of about £400. I am going to issue an appeal to the Regiment—I see Colonel Boileau here to-night—suggesting that the R.A. Memorial Fund should give a certain sum towards it. I do want to see the Regiment's Monument put up in a way to do credit to the Regiment, and not that it should be left crumbling to pieces as it is now so that in a very few years none of it will remain. If every officer will give a trifle towards it I am sure we should send out something worthy of the Regiment. (Hear, hear).

There is a monument put up at Scutari, in the memory of the sailors and soldiers who fell during that war, by Queen Victoria and her people. The only face on it you cannot read is the English one, because that is the one most exposed to the weather. I could not decipher it; I was obliged to go to the French side to see what the inscription was. That I have reported to the Board of Works, and I hope the inscription will be restored. I do not think I have any more to say, gentlemen, I am much obliged to you for listening to my story.

I would just like to say in conclusion that the last visit I paid to the English cemetery finished up one of the most interesting trips I have ever made in my life.

DISCUSSION.

CHAIRMAN: Would anybody like to make any remarks, or ask any questions?

MAJOR GENERAL ARBUTHNOT: I think Sir Robert Biddulph will, if you ask him.

GENERAL SIR ROBERT BIDDULPH: General Belfield, ladies and gentlemen. I had not intended to add any remarks to what General Arbuthnot has said, but I am unable to refrain from responding to your very gracious invitation, therefore, I will only say in the first place that I must express my regret that I was not able to accompany General Arbuthnot, as he invited me to do at the beginning of this year; circumstances prevented my going.

There are only one or two very small remarks that I would like to make about the lecture.

In the first place as regards our artillery materiel, it is perfectly true the guns were exactly the same as had been used in the Peninsula, but I think there were certain improvements which had considerable effect on the efficiency of the artillery during the war, and those were not only the question of the tubes (which General Arbuthnot mentioned), but also only a year before a wire friction tube had been introduced, which was a very great advantage because we had no longer to use straw matches in port fires. The Boxer fuze had also been introduced a year before, and that was an enormous advantage, because by the old way you had to

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saw off the fuze to certain lengths, and possibly to bore out part of the composition to shorten it still more, a lengthy undertaking, whereas with the Boxer fuze an awl was used which simply made a hole in the requisite place, and it was done in a second.

But putting these small matters aside, there are one or two things that General Arbuthnot has mentioned which I think really require a little more emphasis. He mentioned particularly how close the French lines were to the Malakoff. The day after the Malakoff was taken I went down there. No one was allowed to go into the trenches as a rule, but the late Sir George Barker, who was then in command, asked me to go down with him; he took me as his Adjutant, and I went all over the place where the fight had taken place the previous afternoon, and the French lines were so close that you could have thrown a small stone easily across. It is a few feet only from the edge of the hill.

GENERAL ARBUTHNOT: About 30 feet as a matter of fact.

GENERAL SIR ROBERT BIDDULPH: I call that a very short distance—and the consequence was that when they took the Malakoff, they took it, as it were, by surprise, and they got in with the loss of half a dozen men. It was most remarkable. They however, lost a large number of men in holding it.

The following, although it has been mentioned before, is worth stating again. It had been observed from the tops of our ships of war, that the Russians used to relieve the garrisons of the Malakoff and other places generally at midday, and in order to avoid the loss of a double garrison on the Malakoff, as a tremendous bombardment was going on, they used to march out the old garrison before the new relief came in. This was a valuable secret, and it was kept very secret indeed; and it was that very thing which gave occasion to the famous account of the Council of War held by Pélissier, General Simpson, and others. After everybody had given an opinion about the assault, Pélissier said, "I also have my opinion, but I keep it in my own breast, I do not tell it to my pillow," and he walked out and said nothing. This was his secret, that the old Russian garrison at the Malakoff was relieved before they marched in the new garrison. Therefore, he arranged for a signal to the men, and when everything was ready for the assault, directly the signal was given from the ship that the garrison had marched out, the troops, being so close, were in before the new garrison. That is how the Malakoff was taken so easily. The French had 3,000 men engaged in the assault on the Malakoff and the little Redan. They galloped the horse artillery down and brought them into action just opposite the Little Redan and opened fire to strengthen the assault. The Little Redan never could be taken, but the Malakoff they took and held, owing to the fact that the Russians had made it a closed work, and therefore when the French once got in they could not be got out. The French tried to get into the Little Redan, but had no better success than we had. When I went the next morning all their dead were still lying there; they were only able to remove the wounded, but they had taken the dead up and laid them in rows by hundreds outside the Little Redan in a ditch, and it looked exactly as

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if the regiment had marched up and grounded arms; it was stacked with French muskets and bayonets as thick as possible along the outside of the work where the men had been shot in trying to take it. Our own attack upon the Redan was, of course, an equal failure. We had not the great loss that the French had, because we had not so many men engaged: the great difficulty of capturing it was because it was open at the rear, and the Russians could bring up on the broad front as many men as they liked, and our men only holding the centre could not stop them. The Engineers who went forward used all their exertions in filling up this ditch, and they had filled up more than half to make a broad roadway in. But another difficulty was that the Russians had got in the interior what was called a parados in fortification language. A few months after the siege was over, when Major Windham, who commanded the storming party of the Redan, was dining with my chief, Sir David Wood, he said: "If ever I had to do that again I think I should try the effect of a lodgement." I rather held up my hand mentally at this, because we had always been taught that a lodgement was the first thing to be done if you got into a place. I do not know any place where it would have been easier to effect a lodgement on account of this parados running through. As General Arbuthnot truly said, the Malakoff was the key of the position. When once it was taken it was a mere waste of life to attack any other. The only object in urging an advance upon the Redan was to help the French by effecting a diversion from those who were attacking the Malakoff, and also our own Generals did not want to be out of it and leave all to the French.

General Arbuthnot mentioned Inkermann, but I do not think he gave quite enough of it to us, because it was a very important battle, and it had the very greatest effect. The extraordinary part of it is that, had the Russians carried out their own plans, nothing could have saved us from defeat, and it must have been the very greatest disaster. The English would have had to raise the siege, and we should have been thrown back upon the sea. The Russian plans were extremely good. The sortie on the Little Redan on the 26th October, evidently was a reconnaissance in force to endeavour to see whether we had fortified what we called the Inkermann Ridge. They were not able to proceed very far because they were very strongly met at once and driven back; but there can be little doubt that it was a reconnaissance in force preliminary to the big battle they intended to fight there, and that really ought to have given our people the hint to strengthen the position and make it more unassailable, which we did not do. One column, General Pauloff's, came across over the Tchernaya and came up the winding road which would bring them right on the top of our central position, and the other (Soimonoff's) column came out of Sevastopol, up the Sapper's road and was intended to deploy to its right on the Victoria Ridge, and Pauloff's column to deploy on its right also on the other side of the ridge, so that the Russian forces would have come up two columns in line, one coming up the Inkermann Ridge and the other the Victoria Ridge. The Victoria Ridge ended at the windmill erected for our siege depôt, where all our ammunition was stored. Their officer's

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(Soimonoff) orders were to come up to the left of the ravine according to the proper topographical designation, which means the left as you go down; but the people who headed his column, took it as their proper left, and they came up and deployed on the Inkermann Ridge, and occupied it; when Pauloff came up behind, from the other side of the Tchernaya he found that his ground was already occupied by Soimonoff, the two columns met, and were all massed together, and our flank could not be turned, because the Light Division was sent down to hold the Victoria Ridge, and prevent anybody coming up. The consequence was that the Russians were kept there, owing to the configuration of the ground, all in one line; the infantry and guns upon the ridge were really I think, in a kind of concave formation, and the infantry without knowing it enfiladed and crossed their fire. The right battalion fired right down across Soimonoff's column and the left ones enfiladed Pauloff's, and that caused the enormous Russian loss; though we did not know at the time because the whole country is so covered with bushwood that it was very difficult to see things at all until after the siege was raised. We had really a most providential escape, owing to the Russians being confined in that space so that they could not do anything.

Two days ago I was visiting an old officer who was on Lord Raglan's Staff at Inkermann, and he began to talk about the Crimea; he is an old man about 86 now. He said to me, "You know I often think of Inkermann; I was there the whole time, and the first thing that turned the battle and made us feel that it gave us a little chance of success was the 18-pounders coming up. I never saw anything more beautiful. The Russian Artillery from Shell Hill were not silenced a bit; our field guns were not able to silence them; but directly these two 18-pounders came into action, shot after shot went straight into them knocking them and disabling the guns in a most extraordinary way." And he said; "It was the turning point, to my mind, of the battle." I thought that was a most interesting reminiscence and that Artillerymen would be pleased to know that the guns had this very striking effect. That was a man in the Guards, Sir Frederick Stephenson.

I have nothing more to say except to congratulate General Arbuthnot on having had such a successful journey to the Crimea, and having come back under circumstances which have enabled him to give us this account of it now some months afterwards.

GENERAL ARBUTHNOT: May I make one remark, Sir, which I forgot in my Lecture, about this Bible?

CHAIRMAN: Yes.

GENERAL ARBUTHNOT: Ladies and gentlemen, the presentation of this Bible to me was, I think, the most touching thing in the whole of my visit. This Bible was taken by the Russian regiment which I have before named, in one of their sorties in 1854. It was found in the trenches. It has been in the possession of the regiment from that day till I visited them last April; it was handed down from father to son; and when I went there it was in the possession of the grandson of the man who took it. When he heard that I was going

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to visit them he brought it to Colonel —— and asked him to give it back to me as a mark of esteem and respect for the English Army. The handing back of this Bible, which you may look upon as a regimental relic of theirs, shows I think such good feeling that it really touched me more than anything else they did for me.

CHAIRMAN: Is it known who the original owner was?

GENERAL ARBUTHNOT: No, the fly-leaf unfortunately is torn off. It is a little stained with the trenches, otherwise it is a perfectly good Bible; and it shows the respect they have for the English Army when they had it in the Regiment for 56 years and then they gave it up to me. It touched me very much.

With regard to what Sir Robert Biddulph has said I did not attempt to give an account of the battle, because it was not the subject of this lecture, but I quite agree with every word he said with regard to the way in which the French took the Malakoff, and the reason why the English were unable to hold the Redan; and also with regard to the 18-pounders. Those 18-pounders came up in the middle of my battery; we had to open out right and left to let them in between the right and left half batteries, and it was those 18-prs that caused us so much loss, because the enemy fired at us all the morning after they got there.

CHAIRMAN: Has any other officer anything to say? (After a pause): Sir Robert Biddulph, ladies and gentlemen, it is, of course, a subject that admits of no discussion, because not many of us are prepared to take on what happened 55 years ago; and to judge by what you have said, Sir, we could not have had, within the limits of a lecture a more correct description of what happened than General Arbuthnot has given us.

If I may refer to one thing you mentioned yourself, Sir, with regard to the Russians deploying on the wrong side of the ravine; that is referred to in Kinglake, but I do not remember that there the reason you give is assigned to it. It is, however, a rather curious thing that I do remember this, that talking it over many years ago with my father, who was there, he said, "Don't ever make a mistake about right and left when you are talking about rivers and that kind of thing like the Russians did in the Crimea." I do not think I ever asked him what he meant, but it is possible he was referring to that very occasion.

Well, ladies and gentlemen, this has been an interesting lecture I am sure to all of us, and yet it seems to me that the interest must be very greatly on the side of General Arbuthnot. For a man to have been on the ground, as he was, for I do not know how many months, I think very nearly two years, and to have been one of the very few men who landed at first and left at last, who was never absent from his duty during the whole of that period; and again when you come to think that the whole of the operations took place in an extremely confined space, the whole of the ground, the whole of the features and everything must have been burnt into his mind in a way that perhaps one can hardly understand; and then after all these years to have gone back and to have gone all over the ground, and

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to find his memory correct, to find that he was actually able to look at where he himself was in action, seems to me one of the most interesting things any man could possibly have undertaken. (Hear, hear). I shall never forget a letter which, in all the rush and bustle of the time when he was out there, General Arbuthnot wrote to me describing a great deal of what happened to him, and what had been done, and the amount of kindness and courtesy he had met with. One must admire his pluck, I think, in going out (applause), it is no good pretending that he is a chicken when he is talking about what happened 55 years ago. And one also has to admire, I think, his good stomachic powers when trying to compete with his hosts out there.

Now thinking of the South African war in which many of us took part, one can hardly conceive a young man who had just begun life in that war in 1899 going back 55 years hence, somewhere about 1955, and then coming home, and very possibly in this Hall, recalling what he had done and where he had been. It would be a wonderful experience 55 years hence if any man could be occupying the same position that General Arbuthnot is now of describing his experiences after having gone over the ground again. I daresay a great many Englishmen have gone back there; personally I only know of two; General Arbuthnot is one, and an old friend is the other, who fought through a great portion of the war, and went back himself, and eventually became Consul General out there.

There is one thing I should like to mention because General Arbuthnot brought it up, that is the question of field kitchens. We have been trying them and trying them rather largely during these last manœuvres. Whether we are actually trying the Russian one at Aldershot I do not know. We tried five different kinds in the Fourth Division, and one was mounted on a bicycle.

GENERAL ARBUTHNOT: That is not the Russian one.

CHAIRMAN: No, I say I do not know whether they are trying it at Aldershot. I am merely speaking of those we tried. We tried different forms, one of which instead of cooking the dinner practically nearly killed the cook because it blew up. I met him starting out for a field day with his arm bound up, and I asked him what had happened, and he said, "the kitchen had blown up"; that was not a success. That no doubt either was not the Russian kitchen. But we have tried them, and I hope eventually we may get something that will serve us well. At the present moment the question of transport looms largely; they are very heavy and we have not yet got either a really satisfactory kitchen so far as I know, nor have we satisfactorily solved the question of transport. But we have it strongly in our minds, and we went so far this year that we made our field kitchen, or at any rate the arrangements for immediate cooking, the first line of transport and brought them up and put them on the same level so far as transport is concerned with our ammunition wagons.

It seems to me judging from the photographs that, while we and the French, and the Allies generally, were capable of turning the Russians out of Sevastopol as we did, and defeated them, they have

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defeated us in the class of monuments they put up afterwards. Some of ours are most appalling things. Theirs have the great merit, a good many of them, of being artistic.

I do not think I have anything more to say except to propose a vote of thanks to General Arbuthnot for his kindness in coming here, and for the extremely interesting lecture that he has given us.

GENERAL ARBUTHNOT: I am much obliged to you, Sir, and ladies and gentlemen, for your vote of thanks for this lecture.

What General Belfield says is perfectly true; it was more interesting to me to go over that ground than it would be to you to listen to what I had to tell you. It is the most interesting trip I ever made in my life. I have been asked by the Russians to go out again at the time of their Jubilee—for they are going to have a Diamond Jubilee in four years time, and I only hope that General Belfield will come with me.

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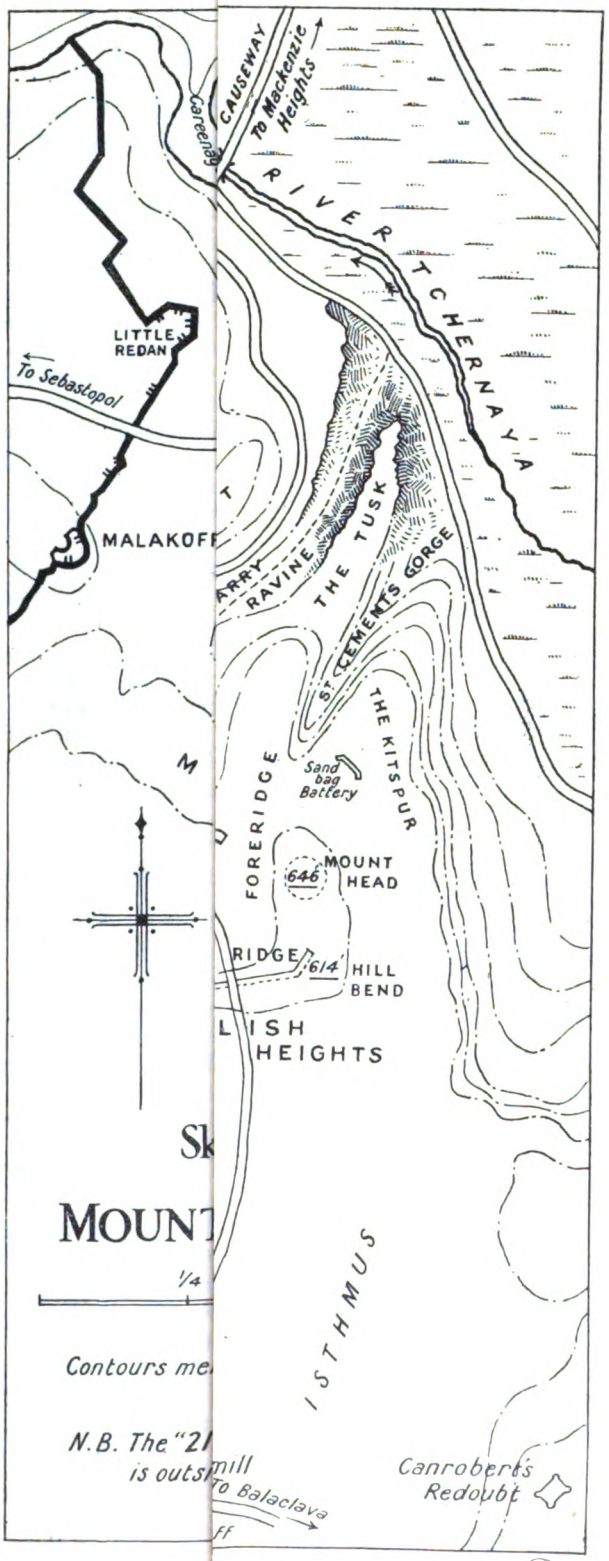

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AEROPLANES IN 1911.

By COLONEL F. G. STONE, *psc.*, R.A.
(Member of Council of the Aeronautical Society of Great Britain).

A STUDY of the achievements in flying during 1910, well repays the time and labour spent on it, and furnishes already clear indications of the lines which evolution is like to follow in 1911.

The first thing that strikes one is, that while the records under all heads which were made in 1909, have been eclipsed over and over again in 1910, yet, there have been no remarkable improvements in the efficiency of the machines themselves: improved, they certainly have been, but not in a degree at all proportionate to the immense difference between the actual achievements of pilots in 1910 and 1909.

The principal improvement in matériel is in the engines, which are certainly more reliable this year than last year; but after all, the great feature of the most brilliant flights of 1910 in respect to engine reliability and efficiency is that they have nearly all been made with the same engine, viz., the Gnome rotary engine of 50—60 h.p.: now this engine is not a novelty of 1910, it is practically the same engine with which Henry Farman won the prize (on his own biplane), at Rheims in 1909 for the longest uninterruped flight, and established a record at 112 miles. There has also been a very marked improvement in the potentiality of the Blériot cross channel type of monoplane, due to equipping it with a powerful engine: the engine with which M. Blériot accomplished his cross channel flight was a 27 h.p. Anzani; the engine with which all the successes have been achieved this year is the 50—60 h.p. Gnome, the structure of the monoplane having been suitably strengthened to stand the additional strain.

There has also been a more general adoption of the principle of a tail elevator to assist the head elevator in controlling the flight path, this is found of great value in overcoming the *vis inertiæ* of the tail, when owing either to its length, or to the angle of flight, it is difficult to alter the angle of incidence rapidly by means of the head elevator alone. But here again there is nothing new, Cody's machine was, as originally designed, fitted with a tail as well as a head elevator, or perhaps in his case, it would more correct to call it a rear elevator; Maxim's biplane also has a rear or tail elevator.

There has been practically no improvement in propellor efficiency, and it is here that there is most room for improvement, probably on wholly different lines from any that we are acquainted with on existing types of aeroplanes. The loss of power which appears inseparable from even the most perfect propeller designed on the principle of the screw,—a principle which gives such splendid results in the denser medium of water—seems to proclaim loudly, that here we are on the wrong tack, and that some other means of propulsion must inevitably be discovered to drive machines through the incomparably less dense medium of the air. We may expect that the

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new means of propulsion will be as great an advance on the present system, as a turbine driven marine vessel is on an old paddle wheel craft.

The great feature of flying in 1910, has undoubtedly been the immense improvement in the quality of the pilots, and the accession of so large a number of new men to first class rank. We have seen this year any number of flights which completely disposed of the idea that an aeroplane could only be used in comparatively calm weather: on October 22nd, 1909, Hubert Latham, demonstrated conclusively at Blackpool that an aeroplane could ride out a moderate gale; this was an epoch making performance, only three months subsequent to his two attempts to fly the channel, when he and Levavasseur, the maker of the Antoinette machine, spent weary days at Sangatte, waiting for a clear calm morning, only to have the prize snatched from their grasp by Blériot, who arriving later on the scene was yet more prompt to put his fate to the touch. And yet it was not the wind which defeated Latham, but ignition trouble.

What Latham achieved in October, 1919, in a high wind,—with a machine which was practically identical with the one for which a calm day had been so impatiently awaited to enable him to venture on the channel flight,—has in 1910, been, achieved by many others, principally on Blériot and Farman aeroplanes in Europe, and Curtiss and Wright machines in the United States. It is the pilots who have improved; the machines are practically the same. It was the fashion in 1909 in military circles to say "the aeroplane will never be of any use until an automatically stable machine is invented." In view of the flights which have taken place in 1910, we might now say "the best aeroplane will never be of any use until we have highly trained and experienced pilots to get the full value out of it." This fact has been readily recognized by our friends across the channel, who have had a Military Aeroplane School in full swing for the greater part of the year 1910, and organised an Aeroplane Scouting Service, which gave excellent practical results in the French Army manœuvres: and here again it is noteworthy that the machines were mostly the same as had been used to far less advantage in 1909, viz., Antoinette, Blériot, Henry Farman, modified Wright, Breguet, and Sommer, the three latter may claim to be improvements on the 1909 models, but it was the improvement in the number and quality of the pilots which made the experiment a success, not the improvements in the machines.

The records under all heads tell practically the same story:— On December 1st 1909, Latham made the worlds record for height on an Antoinette machine, at 1,558½ feet: this was beaten by Latham himself in 1910 on the same machine, and subsequently by Paulhan, Olieslagers, Weyman, Tyck, Legagneux, Cattaneo, Brookins, Drexel, Jacques, Moram, Chavez, and others, until on October 1st, all other performances were eclipsed by Wynmalen on a Farman machine, with an altitude of 9,119, only to be beaten again by Drexel on November 23rd, with 9,450 feet and by Johnson with 9,714 feet! It was the improvement in the men, far more than in the machines which achieved these records.

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What then will be the tendency in design in 1911 to meet military and sporting requirements; will the existing machines remain as at present designed, awaiting the revolution which may be brought about by some new system of propulsion?

As regards military designs, the French War Office has given us something of a lead, in laying down the conditions for the military competition which is to take place next October. Each machine must be fitted with three seats, one for the pilot, one for the mechanician, and one for the observer or scout officer: it must be capable of carrying a useful load of 300 kilogs., not including fuel, oil, water, &c.; minimum average speed 60 kiloms. an hour over a distance of 300 kiloms.: the machine must be capable of landing and restarting on ploughed land, prairie, stubble field, or meadow land; and it must be capable of being transported by road or rail, without being taken entirely to pieces.

The trials will be of an exhaustive character, but it is unnecessary to give further details: the prizes awarded by the French Government, amounting in all to about £44,000, are sufficient to guarantee that there will be no lack of competition.

The two aeroplanes which have achieved the largest number of successes all round, are the Blériot and Henry Farman; the former a monoplane, the latter a biplane, and both equipped with the 50—60 h.p. Gnome rotary engine: the superior merit of these two aeroplanes was recognized by the Bournemouth Committee. The Blériot machine has the highest horse power per square yard of bearing surface of any successful aeroplane and is an excellent example of a strong tendency to increase power and speed and reduce size and weight as far as can consistently be done without imperilling the strength of the structure; aeroplanes which are developing on this line trust to high speed to maintain themselves in the air, and the advocates of high speed as a means of ensuring stability in adverse meteorological conditions, encourage evolution along this line to a certain extent but not whole heartedly. The value of high speed in this connection applies equally to all types of aeroplanes, but the special feature of the high engine power on the Blériot is not by any means entirely in relation to speed; the prominent feature is the reduction in bearing surface and the comparatively steep entering angle, which requires a correspondingly high engine power to produce a speed which will maintain the aeroplane in flight. This Blériot machine is conspicuous for the short space in which it can leave the ground and the rapidity with which it can ascend to great heights; it is essentially the machine for rapid evolution in the air, and, from the military point of view would probably be able to outpace, out manœuvre, and *rise above* any other aeroplane in existence. It must be borne in mind that for military purposes it is not enough to be able to carry out scouting duties with certainty and precision, when there are no hostile aeroplanes to interfere; it is also necessary to be able to hold one's own in the face of opposition. There is however a drawback to this type of machine which must be reckoned with, viz., that owing to the great difference between the entering angle and the gliding angle, and the tail being in flight lower than

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the head,—in the event of ignition failure or other engine trouble, the pilot must *instantaneously* bring down the head of the machine, otherwise an immediate fall on the tail is inevitable; and this has undoubtedly been the cause of many of the accidents which have been recorded. In other words, the Blériot monoplane is a machine of higher potentiality perhaps than any other, but in order to utilise it to the full extent this potentiality and at the same time avoid accidents, it is necessary to have a pilot trained up to the possibilities of his machine.

The advocates of high speed as a means of rendering the aeroplane more independent of weather, naturally place speed first, and if weight be added to speed, a much higher degree of stability will be assured than would be the case with a relatively light machine travelling at the same rate; it is the momentum which tells—what we gunners know as *energy*, i.e., $w. v^2$.

Now while it must be admitted that speed is perhaps the most valuable factor of the many which go to make stability, and that weight and speed combined seem to be the natural goals to aim at in this connection; yet, there seems to be a natural limit which will be arrived at automatically, beyond which it will be found impracticable to increase speed, and weight, owing to the difficulty of landing with a high momentum except under the most favourable conditions. In this respect it is clear that a light machine can afford to land, while travelling at a higher rate of speed than a heavy one: thus suppose we have two aeroplanes A and B, A weighs one ton, and B weighs two tons; A travels at 70 miles an hour, and B at 50 miles an hour:—

$$\text{then } \frac{\text{A's momentum}}{\text{B's momentum}} = \frac{(70)^2}{(50)^2 \times 2} = \frac{4900}{5000} = \frac{49}{50}$$

in other words, if B could land safely while travelling at 50 miles an hour, A could land while travelling at 70 miles an hour.

In an article on the Channel Flight (Journal of the Royal Artillery, October, 1909), the author ventured on the view that the tendency of aeroplane construction would be towards lightness; the experience gained in 1910, appears to confirm this view, and, notwithstanding the one objection to the Blériot design with high power engine as regards the difference between the flight angle and the gliding angle, we look forward with some confidence to the evolution of the military machine taking place along the lines which have made the Blériot successes the great feature of 1910 flights, and pointed significantly to the nature of these successes marking out the Blériot design as embracing the points most required in a military machine. But,—as stated above, in order to utilise the Blériot aeroplane to its full potentiality, it is necessary to have a pilot trained up to the possibilities of the machine; and inasmuch as its potentiality is so much greater than that of other machines,—by exactly so much the more must the training of the pilot be perfected, in order to ensure efficiency.

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A 4th Subaltern or a 2nd Captain.

By LIEUTENANT J. A. DANE, R.F.A. (S.R.)

THE amendments to Sections 65 and 71 "Field Artillery Training," published in 1910, add considerably to the duties of *one* of the section commanders of a field battery. At first sight it is difficult to say upon which section commander these duties should devolve, as, since the publication of these amendments, the above mentioned sections of the training manual read somewhat ambiguously.

Formerly the battery commander was to be accompanied on his reconnaissance by "not more than two mounted men," the remainder of his staff following at a considerable distance in rear. Now, however, he is given permission to be accompanied by a section commander "if necessary," and indeed he is subsequently informed that this course will generally be found advisable. The duty of this officer is "to convey any information required to the battery leader, "or to select the actual position for the guns, should the battery "commander prefer to remain at his own observing station."

The first portion of the latter quotation is held by some to mean that the officer accompanying the battery commander should not be the senior section commander, as the latter officer is the battery leader,[1] to whom the information is to be conveyed. This contention does not seem to be upheld by the remainder of the sentence quoted, for it is only reasonable to assume that the choice of the actual position for the guns would, if delegated at all, be only delegated to the most senior officer available. A reference to the Annual Report of the School of Gunnery for Horse, Field, and Heavy Artillery, 1909, which doubtless inspired the amendment to "F.A.T." under consideration, appears to support this assumption. There we read that "it is advisable for the battery commander to be accompanied "by the senior section commander."[2] On occasions when this advice is followed, the officer personally leading and controlling the movements of the battery, i.e., the battery leader, will be, not the senior section commander, but the second senior.

The fourth paragraph on page 115 "F.A.T." lays down that, when the battery commander is at the observing station and communication with the battery is not direct by voice, the battery leader will give out the orders to the battery by word of mouth; and that whilst performing this duty he will cease for the time to act as section commander. If we accept the definition of battery leader

[1] S. 35 (iii.) F.A.T.
[2] Para 115. Report of School of Gunnery.

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as altered above, it will follow that in this latter paragraph we should substitute " senior section commander " for " battery leader."

The senior section commander also of necessity ceases to act as section commander when he is sent out to act as ranging officer at a distant observing station,[1] as is usually the case when the battery commander elects to stay with the battery.

In the case of a retirement when the Captain is sent back to look for a new position for the battery it is now laid down that he should be accompanied by a section commander.[2] The relations between the latter officer and the Captain are very similar to those between the senior section commander and the battery commander, when the latter is reconnoitring during an advance. Consequently it appears only fitting that the senior section commander should be the one detailed to accompany the Captain.

From practical experience of the system discussed above, the writer has found that the senior section commander of a field battery ceases to command his section from the time the battery commander receives his orders to advance for action until " cease fire " sounds; save and except during the, now-a-days, comparatively rare occasions when the battery comes into action in the open. Even on the latter occasions he is liable to be taken away from his command up to the very moment of opening fire for the purpose of producing panorama sketches.

The effect of all this is that, for a very great proportion of the time the battery is exercising, make-shift arrangements have to be made in the senior subaltern's section. A No. 1 has to leave his sub-section to take command of the section, thus causing a succession of casualties throughout that sub-section before even proceedings start. A method of procedure not quite in accordance with Cromwell's advice to " keep our powder dry," or the more modern motto of the boy scouts, " Be Prepared."

The remedy would appear to be, either to relieve the senior subaltern of a battery from the command of a section and post an additional subaltern in his place, or else allow for an additional sergeant to act as understudy to the senior subaltern.

If we recognise the principle that a section commander's duties are normally best carried out by an officer, the former remedy is of course the one most likely to be satisfactory.

One objection that may be urged against this remedy is that the senior subaltern would be unemployed on occasions when the battery is in action in the open. We are told that arrangements for the replenishment of ammunition to a battery under heavy fire are the Captain's business.[3] But no doubt he would be glad of the senior subaltern's assistance, more especially if the task was the more difficult by reason of the battery being in the open. Again, the senior subaltern would come in very handy on such an occasion, were he in reserve, should a casualty occur amongst the other officers, as might well be the case if the battery was in an exposed position.

Another objection that may be brought forward is that the senior subaltern would be without any definite occupation in barracks.

[1] S. 40. (iv.) F.A.T.
[2] S. 71. (ii.) F.A.T.
[3] S. 77. F.A.T.

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Need this be the case? It could scarcely but be advantageous if all the battery staff, and to a certain extent those N.C.O's and men who are destined to be drafted to form the brigade staff, were trained together under one officer. "F.A.T." states that under certain conditions the senior subaltern must supervise the means of communication in the battery.[1] To do this effectively he ought to be a practical communicationist himself. He would, therefore, appear to be the most natural person to train the battery communicationists, and by so doing he would gain a personal knowledge of each man's capabilities which would be of great value to him when discharging the above mentioned duty. For the reasons set forth in a paper lately published in this Journal,[2] it appears reasonable to include look-out men, mounted orderlies, ground scouts, men trained in patrol duties, and of course signallers, under the designation of "communicationists." Besides these only the range-takers remain to complete the battery staff, and their training might well be co-ordinated with that of the remainder; an obvious way of doing so being to place them under the same instructor. If the senior subaltern was placed in charge of this instruction he would find plenty to do, and any time not so spent could be profitably employed in assisting the Adjutant in the training of the brigade staff generally.

Doubtless other objections may be urged against such an innovation as a subaltern without a section, but precedents may be found in the cases of the "observation officer" of a heavy battery, and of the "4th subaltern" of the 1906 "F.A.T.," whose duties as laid down in the book were as nebulous as the officer himself.

The question next arises, how would an increase of one subaltern per battery throughout the field artillery affect promotion?

Presumably if the number of subalterns was increased as suggested by one-third, the time before promotion to Captain would be increased by the same amount. This evil might be remedied by increasing the establishment of Captains and by filling one-third of senior subalterns places by junior Captains. The establishment should be calculated per brigade, as if it was for the field artillery at large, one brigade might find itself with six Captains and nine subalterns, and another with three Captains and twelve subalterns, Adjutants excluded, thus putting a different complexion on the orderly officer's roster in each case. An equitable proportion would appear to be four Captains and eleven subalterns, excluding the Adjutant. This would mean that the senior subaltern's place in one battery in each brigade would be taken by a Captain, and it might be arranged that a senior subaltern should stay in his battery on promotion until he was posted as a "puckka" Captain.

Should such a functionary as has been suggested ever be called into existence a suitable title must be selected for him. "Satellite officer" has been heard, but, although most appropriate, it lacks a military ring. The rank of "Captain-Lieutenant" was introduced in the regiment in 1720, and in 1804 the title was changed to that of "Second Captain." The former of these titles is somewhat of a mouthful and the latter would be in two-thirds of the instances we

[1] P. 115, F.A.T. as tentatively amended above.

[2] The Communications of a Field Artillery Brigade. R.A.J., May, 1909.

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have discussed a misnomer. The title " observation officer " employed by the heavy artillery would also be a misnomer, except during a " plotter series." As the officer under discussion would be the instructor of the communicationists the title "Communication Officer" appears appropriate, and has the advantage of being unappropriated by any other functionary at the present time.

The whole question is largely one of money, and any proposal for an increase in the establishment of a battery is certain to be discouraged at first sight on this ground. On examining the proposal more thoroughly, as has been attempted in this paper, it will perhaps be realised that unless an increase is made, if not of officers, at least of sergeants, we shall be running a great risk " on the day " of spoiling the ship for a ha'porth of tar.

That this contingency may be considered, and, if thought likely, averted, is the only excuse that can be brought forward for the production of this paper on some of the " minor " tactics of a field battery.

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The Topography of the 1870 Campaign.

1st—18th August.

(WITH 3 MAPS AND 8 SKETCHES).

By LIEUT. J. H. M. CORNWALL, R.F.A.

THE initial battles of the 1870 campaign were fought in the tract of country lying between the middle Rhine and the Moselle. We may divide this area into three regions, each with its special characteristics:—

A. The Rhine Valley and the Vosges.
B. The Saar Valley.
C. The Moselle Valley.

A. The Rhine Valley and the Vosges. (Sketches 1—3).

From Bâle to Mannheim, a distance of 140 miles, the Rhine cuts its way between the Black Forest on the east and the Vosges and Hardt mountains on the west, forming a flat, fertile plain about 20 miles wide, with the mountains rising steeply on either hand. The southern Vosges form a belt about 30 miles wide, with peaks rising to a height of 4,500 feet, a formidable military barrier. From south to north the Vosges chain declines in height and is continued to the north-east by the Hardt mountains of the Palatinate, which only rise to a height of 1,500 or 2,000 feet, with a much gentler slope than that of the Vosges. The slope of these mountains is much steeper on the east where they drop into the plain of Alsace than on the west, where they merge into the uplands of Lorraine.

Between Bâle and Mannheim, the Rhine varies from 200 to 430 yards in width and from 3 to 20 feet in depth; in 1870 it was only crossed by railway bridges at Strassburg and Maxau. The III. German army which had concentrated in the Rhine Valley between Landau and Germersheim had the task of forcing the passes of the Hardt and the northern Vosges. The III Army first came in contact with the French at Weissenburg (sketches 1 and 2), situated on the edge of the Rhine Valley, with the mountains of the Hardt rising immediately to the west. The forest of the Bienwald covers the greater part of the Rhine plain at this point, and the Weissenburg district, between the Bienwald and the mountains, is well cultivated

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with crops, orchards and vineyards, and dotted with trees, chiefly poplars. The Lauterbach is an insignificant stream.

The next engagement took place at Wörth (No. 3 sketch), some 12 miles further south-west, where the hostile armies confronted each other on the slopes on opposite sides of the Sauer (about 30 feet wide) which flows through flat meadows, from half a mile to a mile in width. The slopes on either side of this valley are covered partly with woods, partly with crops, and partly with vineyards and fruit-trees. At Morsbronn, about two miles below Wörth, the valley widens out into the Rhine Plain, affording more scope for cavalry action. In general the landscape presents a number of rather steep, wooded undulations of ridge and valley.

B. The Saar Valley. (Sketch 4).

The Saar, about 70 yards wide at Saarbrücken, flows through a narrow valley with steeply rising, wooded banks. Big unfenced fields alternate with thickly wooded hills, which rise to a height of about 400 feet above the river level.

The Spicheren ridge (sketch No. 4), commands a fine field of fire over a flat piece of country about 1½ miles wide, now the garrison drill ground, stretching northward and then rising to another ridge (the Winterberg) which drops steeply on the further side into the river Saar.

C. The Moselle Valley. (Sketches 5—8).

The battles of the "special period" (14th—18th August), were fought almost under the guns of the Metz defences. Metz is situated on the Moselle, at the point where it is joined by its tributary the Seille. On the west the valley is walled in by a chain of heights rising to a height of about 1,000 feet, and intersected obliquely by several deep gorges; these heights are thickly wooded, while the lower slopes are covered with vineyards. The gorges of Mance and Montveau exercised considerable influence on the battle of the 18th August, the former offering a serious obstacle to the German assault on the French left wing (sketch No. 7), while the latter ravine afforded the French a covered way to Metz for the withdrawal of their troops. The St. Privat—Gravelotte position was further assisted by the material protection afforded by the strongly built farmhouses of St. Hubert, Moscow, Leipsic, Folie and Montigny, which crowned the ridge.

On the east side the Moselle Valley rises less steeply to the level of the surrounding Lorraine Plateau, a great undulating, well cultivated plain, intersected by a number of rather steep ravines and watercourses.

General Remarks:—

In general it may be said that the terrain of Lorraine is much more "close" than that of Alsace, where the opening engagements were fought. In both provinces it is only in the absence of hedgerows that the landscape differs materially from the familiar English

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countryside. The ubiquitous poplar, too, forms a marked feature of the scenery.

With regard to the sketches appended of the various battlefields, the country has altered but little since the battles were fought. With the exception of a few small changes in the surface of the ground, necessitated by the construction of new railways and fortifications they give a fairly accurate representation of the scenes of the engagements. Allowance however, must be made for the fact that the battles were fought amid standing corn and vines in full foliage, while these sketches were drawn in the beginning of October after the harvest had been gathered.

The sketches were for the most part made from the German artillery positions, in order to show as much as possible the extent of the French positions and the German lines of attack. For instance sketch No. 1 (Weissenburg) shows the ground over which the German infantry attack was pushed home, while No. 2 shows the same position as seen by the supporting artillery at Windhof.

The accompanying sketch-maps show the point of view from which the sketches were made and the area embraced by them. Ranges and angles of sight have not been given as they vary so much with the observer's position.

The success of the German attack against superior numbers, armed with a superior weapon and in good defensive positions, is usually ascribed to their bold artillery tactics and to the well-directed support of their batteries. An inspection of the battlefields has suggested an additional explanation, namely the extreme convexity of the slopes and consequent "dead ground," and the faulty siting of the French fire-trenches. How otherwise can we account for the storming of the Rother Berg by the German field batteries on the 6th August?

[The Sketches and Maps appear overleaf].

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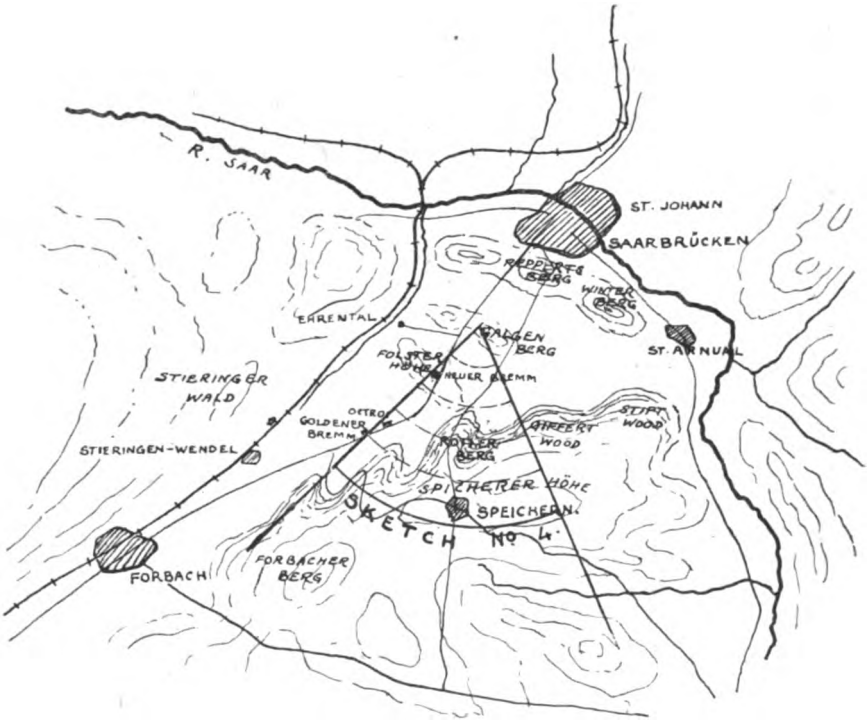

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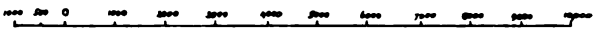

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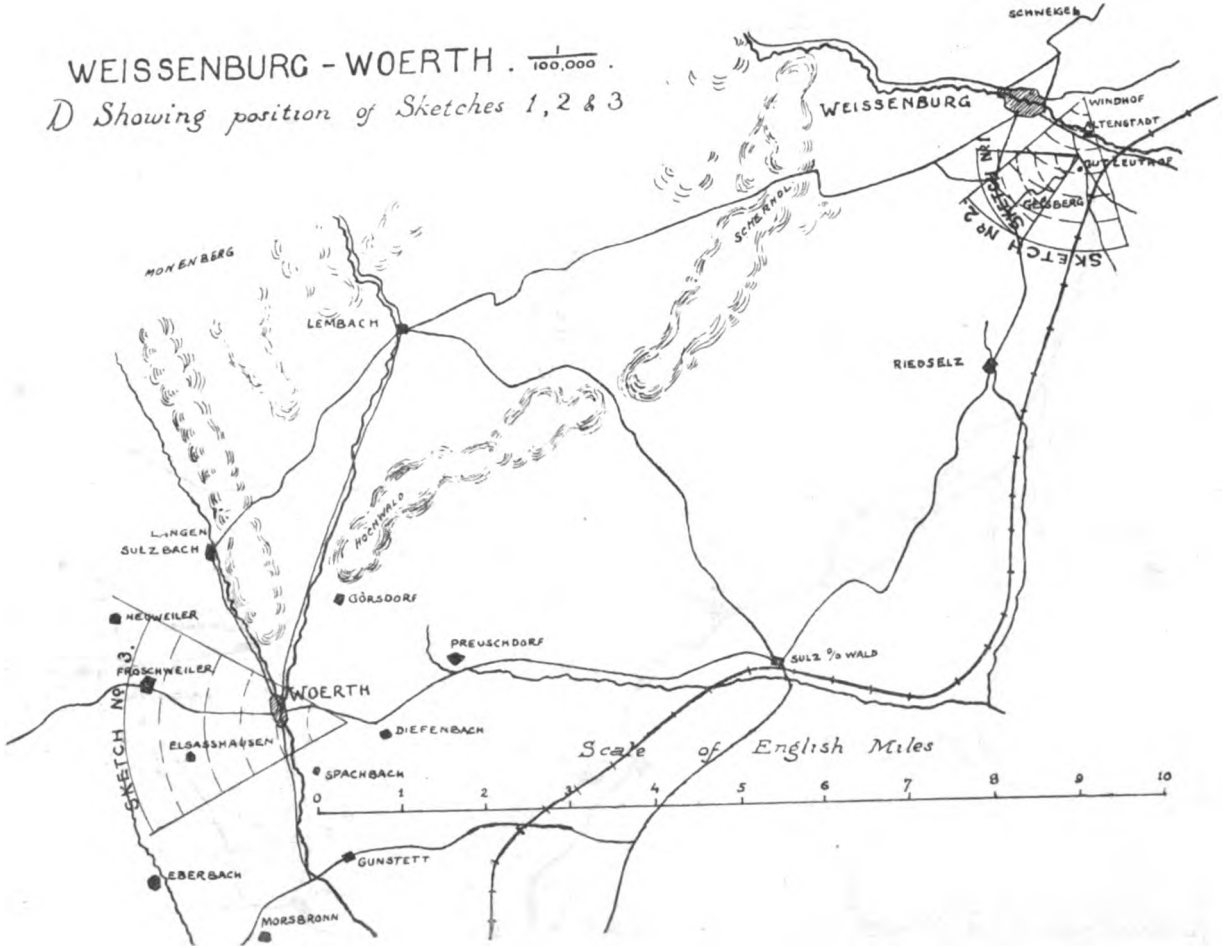

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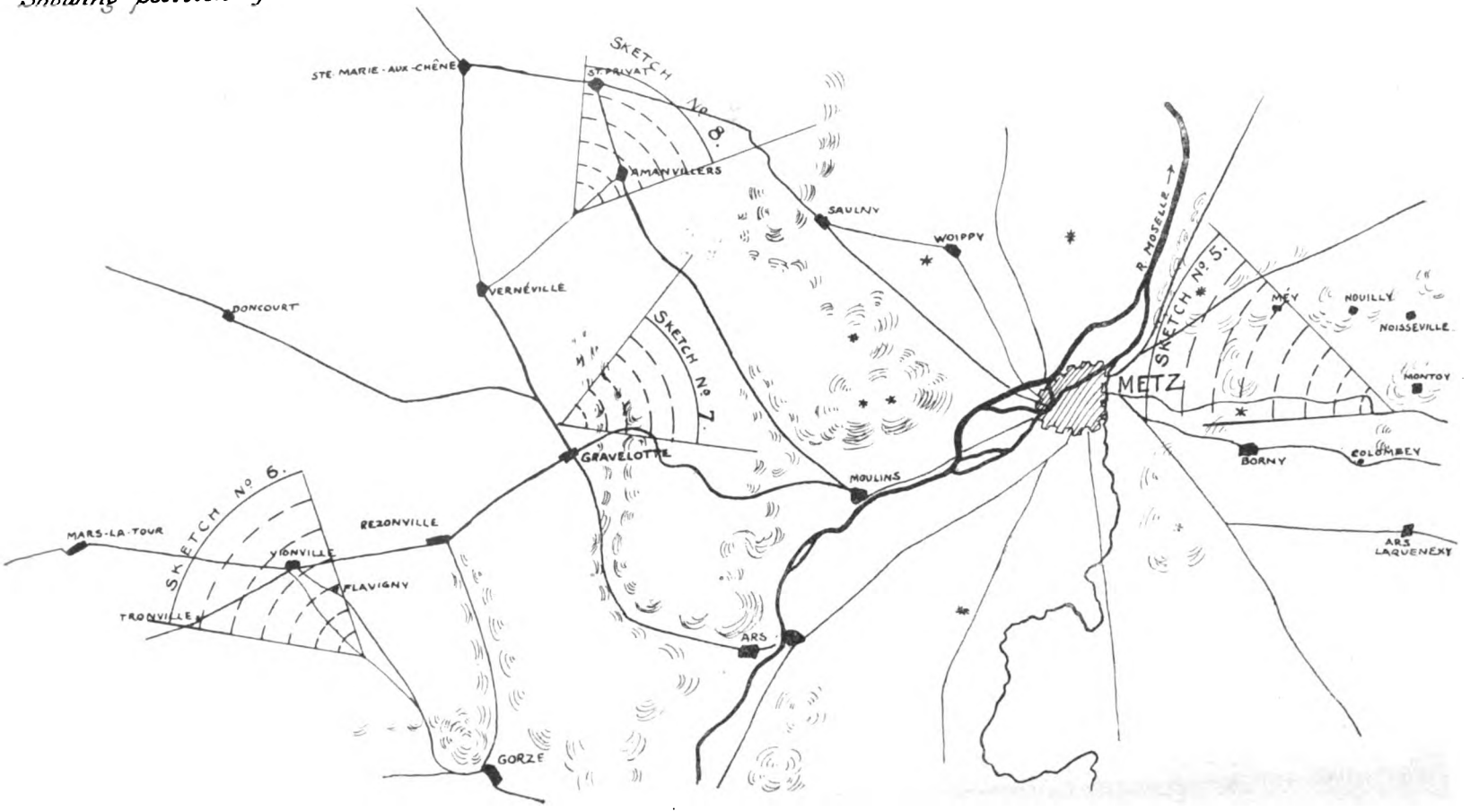
ENVIRONS OF METZ. 1/100,000.

Showing position of Sketches 5, 6, 7 & 8.

Scale of English Miles.



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Lessons concerning the employment of Artillery to be drawn from the East Asian War, 1904-5.

Prize Essay by Lieut. Neuffer, 3rd F.A. Regiment.

Translated from "Artilleristische Monatshefte," November, 1909.

(Continued from Vol. XXXVI., page 179, March, 1910).

We have examples of this in the destruction of the 2nd battery of the 6th East Siberian Artillery Brigade at the Yalu, and again at Wa fang kou, where two Russian batteries, which took up a position in gun pits on which the Japanese artillery had previously been ranging, were destroyed in ten minutes.

Cases where guns were successfully brought into action in the open on change of position were rare; but of course we must avoid extremes in this matter. There are many gradations between absolute invisibility and complete exposure on a crest-line. Batteries in rapid motion coming into view for a few seconds ought not necessarily to suffer heavy losses. At the same time I think one cannot attach too much importance to concealed approach into position, and reconnaissance should be most carefully made with that end in view.

The Japanese frequently occupied their positions during the night. They were compelled to do this by special circumstances; the ground in Manchuria often offered no concealment whatsoever; the Russians frequently remained rooted to their positions for a long time; or the Japanese gun-teams were incapable of rapid movement. Two lessons, however, stood out from the war, and are applicable to our conditions: the approach into position should be concealed; but once the guns are unlimbered, the worst is past—certainly for guns provided with shields—and the word should be "J'y suis, j'y reste."

The Japanese showed masterly skill both in approaching into position and in deceiving the enemy when there. They even took pains to conceal the movements of officers and parties reconnoitring positions; they avoided betraying the whereabouts of batteries already in position by the movements of others coming up; they made free use of dummy positions and of screens, moved away conspicuous objects such as trees and bushes, &c. The Russians did not learn these tactics from them until well on in the course of the war; their carelessness during the early stages was in striking contrast to the conduct of their enemy.

We now come to a point that has been very hotly discussed, namely, what kind of positions one should select. Should they be open or concealed? If this were purely an artillery question, it would

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not have raised so much dust; but it has gone beyond this, and has become a general tactical question.

The advocates of concealed positions claim that the experiences of the Russo-Japanese war bear out their views. We shall accordingly consider the matter.

We have already remarked upon the impression created at the very beginning of the war by the disasters to Russian artillery in the first battles. Why were they annihilated? It was partly owing to their inferiority in numbers and training, partly to bad tactical handling, but also because they were fully exposed to view, right on the edge of crest lines, without being able in their turn to see the Japanese guns at all; even when they used gun-pits, these were so conspicuous as to increase the danger instead of giving protection. It is only natural that the Russians should have ascribed their disasters to defective positions; but they then went to the other extreme, and hid themselves away in positions that were often as much as 500 or 600 yards in rear of the objects covering them. The Japanese also frequently fired from entirely concealed positions. There is this to be said for both sides: That the lack in a great many cases of gun shields made it dangerous to bring guns into action close in rear of a crest line if the enemy resorted to sweeping fire. But the Russians also claim that one can obtain quite as good fire effect from completely covered positions as from any others. Is this really the case?

There are numerous cases which bear out the claim, notably the performances of Colonels Paschtschenko and Slyussarenko, which have been extolled in all writings on the subject. But without making any reflections on Russian reports as a whole, one cannot help feeling doubtful about some of them, especially when the praise is confined to fire effect from the Russian side, and often comes from the gunners themselves. We must always remember that the conditions in this war were peculiar, rather resembling those of wars of position. The movements of the attacking side were slow; there was comparatively little artillery used on either side, and when firing took place from covered positions, it was usually by small groups of a few batteries at a time. So far as I know there were no instances of firing from covered positions at small targets, visible, and moving rapidly. It is of interest to notice what conclusions the adversaries themselves draw from their experiences. The Russians give the preference to covered positions, on the other hand the new Japanese Field Artillery Training says they did not prove a success during the war, and are consequently only to be adopted when circumstances render it absolutely necessary. In the same way military critics in other countries have formed different opinions; some have maintained that in future artillery can only fire from covered positions; others, encouraged still further by the effect of gun shields, are all for fighting in the open, while others, again have steered a middle course. Gradually, however, extreme views have toned down, and it has come to be admitted that there are many steps between open positions—meaning that men in them are completely visible from head to foot—and covered ones, in which they hide away 500 or 600 yards in rear of the object covering them.

If artillery leaders keep firmly to the fundamental idea that the

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guns are only there because the infantry are, they will soon find the way to combine the necessary fire effect with that amount of cover which is also undoubtedly necessary. My own opinion is that in future we shall in most cases select positions in which the guns are placed at such a distance behind their cover that the enemy cannot possibly use grazing fire, or try to fire with high explosive shell, even from howitzers. Whether one should resort to direct or indirect laying is a purely technical question; but in any case the battery commander should select his point of observation so that he can control his battery by verbal orders, and that the preparations for action are not in any way delayed. In most cases these positions will be close up in rear of crest lines, so that batteries can, if necessary, move up rapidly up on to the latter. Positions of this kind are most likely to fulfil the conditions we want; moreover they have the advantage of simplicity, and are not less favourable than others to good fire effect.

If targets should appear that the layer must see in order to follow them, the guns can be rapidly moved up for direct laying. Another point is that if the enemy use high explosive shell only occasional rounds are likely to take effect. Our own fire can continue comparatively uninterrupted, and changes of position can be carried out at the right moment unperceived by the enemy.

Battery commanders must not forget the difficulty of controlling their fire from very distant points of observation, and it cannot be too strongly pointed out that every preparation must be made for this by training in peace time. Such distant points, however, should be avoided if possible, and only be selected under pressure. As a French writer (Meunier) has said we must avoid fighting field guns by the methods of siege artillery.

Battle efficiency of artillery:—

The chief lesson of the war is not a new one, but was proved anew and more forcibly than ever; it concerns the close co-operation of infantry and artillery. The guns will always have to give their attention to those targets which are most dangerous to their own infantry.

The old fashioned artillery duel in which the guns of one side first silenced those of the other, and then turned with all their strength against the enemy's infantry, was seen at the battle of the Yalu, but not again after that.

The opposing guns fired at one another for sixteen hours at Liao Yang, but no result had been achieved by then. It was too difficult against batteries concealed behind natural features of the ground. But still the Japanese always tried by every method in their power to acquire some temporary superiority; and the importance, as well as the inevitable difficulty of it, are recognised in the following passage from the new Japanese Infantry Training: "If it is possible to keep the enemy down by artillery fire, the infantry "advance is made much easier; but as it is difficult to obtain very "effective results against an enemy making skilful use of the ground, "or occupying a fortified position, the infantry must not lose time in "waiting for those results. They must go forward while the artillery

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" firing is still in progress; only in that way can successful co-opera-
" tion between the two arms be maintained."

Against batteries in well selected positions one can, even with superior numbers and heavy expenditure of ammunition, only obtain temporary superiority of fire. And numerous instances could be quoted from this war which illustrate the tenacity of artillery, and its readiness to open fire afresh after a change of position. It is different in cases where the advantages of the ground may not have been fully utilised by the enemy. It should be possible then to pin hostile guns to their positions, and overwhelm them by rapid concentrated fire. For this purpose some batteries should always hold themselves in readiness to open fire the moment the enemy's guns do so.

This power of endurance of artillery has often asserted itself in earlier wars, and is evidently still as marked as ever. With our shielded guns we may expect to find it still more strikingly illustrated in future.

Tne general conclusion to be drawn is that although we cannot hope to annihilate the enemy's artillery completely we must strive to dominate it as far as possible; and the main endeavour of the artillery leader must be to distribute his fire judiciously against the enemy's artillery and infantry throughout the battle, allotting their respective shares to all the units under his command. French writers are quite right when they say that the complete co-operation of the two arms calls for a very high degree of tactical knowledge and skill on the part of the higher leader of artillery. All modern means of intercommunication and transmission of orders are liable to break down, and we are then thrown back upon the tactical experience of the leaders, which ought never to fail us.

There was a striking difference in this respect between the Russians and Japanese. From the very beginning of the war, the Russians showed their lack of tactical ability; every group of guns fired on its own account and there was no higher leadership, no appreciation of tactical situations, no coherence in their work.

Of course it is the practice now to fire over one's own infantry. The artillery support must continue up to the very last moment of the attack, and not be allowed to slacken as the assault takes place. The Japanese even insisted on taking the risk of hitting their own people, so as to go on firing right up to the end. We shall have additional security in this respect from the large numbers of howitzers in the German army, and from the fact that our guns are so carefully constructed.

While there is universal agreement about the question of supporting the infantry, it has not yet been decided whether groups of guns should actually accompany the infantry forward into action. It is certain that machine guns cannot take the place of artillery here, and equally certain that in view of the deadly precision of modern firearms the conditions must be very favourable to admit of guns going forward. There were a few cases in the Russo-Japanese war in which they did so, *e. g.*, the batteries of the 5th Division at Heikutai advanced from 2800 to 1700 yards, and the batteries of the IIIrd Army advanced to within 1300 yards at Mukden. But these cases were rare, partly, no doubt, because the Japanese guns were so

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badly horsed. My own impression is that in spite of all the difficulties, we ought to resolve to follow up our infantry when circumstances are favourable—at any rate with single sections or guns.

Co-operation is as important in the defence as in the attack; we must not, however, keep the two arms too close together in position, as the Russians did at first, but soon learnt not to do. The most important moment in the defence comes when the artillery have to go forward on to high ground to assist in driving off the enemy's infantry attack; there will be less danger in this with shielded guns than there was before. In the fighting on October 15th, 1904, five Russian batteries fired 8000 rounds of shrapnel in 45 minutes (with an interval of 20 minutes), against an infantry column attacking, and drove it off in brilliant style.

There are no good instances to illustrate the action of artillery in pursuit or retreat, so we cannot consider those aspects.

To sum up: The Russo-Japanese war has not produced a final solution of the question how to use modern Q.F. guns with most effect, and many false deductions have been made along with sound ones. But it has given us a good groundwork on which to base our theories for the use of artillery; and it has shown conclusively that in future there will be heavier calls than ever upon the efficiency of leaders in all ranks. It will go well with that army whose artillery leaders know best how to handle their guns, and whose officers fight with a weapon as nearly perfect as it can be made. That is the ideal at which we should always aim, so as to make artillery once more what Frederick the Great called it—the Queen of Battles.

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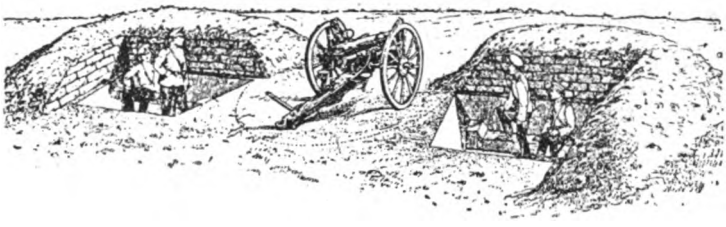
Instructions for the self-entrenchment of Artillery, 1909.

Translated from the official Russian handbook. 30th December, 1909.
Communicated by the General Staff.

1. *The benefit of cover.* To decrease the number of casualties caused by the enemy's fire, artillerymen must arrange for the necessary cover in their positions.

2. *Cover for the detachments.* The simplest mode of obtaining cover for the personnel of a battery is to construct small trenches on either side of the guns (fig. 1).

FIG. 1.



3. *Gun pits.* If, in order to render the gun less conspicuous to the enemy, the gun platform is lowered below the surface of the ground, the entrenchment thus formed is called a gun pit.[1]

4. Cover for look-out men and transmitting orderlies is afforded by constructing pits of a sufficient depth. From these pits a look-out man must be able to see all the ground to his front, and a transmitting orderly his two neighbours.

5. The ground is usually composed of sand, mould or clay; of these three sand offers the greatest resistance to bullets and fragments of shell, mould the next greatest, and clay the least. In winter parapets of snow may be thrown up, such parapets are made, of course, more with the object of obtaining concealment than for the purpose of offering any resistance to the enemy's bullets.

6. *Entrenching tools and their use.* The following entrenching tools are carried by field artillery:—

(a). Spade.
(b). Pick.
(c). Hand axe.
(d). Crowbar.
(e). Two-handed saw.

[1] In the figures measurements are given in arshin and denoted by (x). 1 arshin = 2ft. 4in. + means above ground level, and (-) below.

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A man using the spade must force it into the ground in a slanting direction by pressing with his foot on the blade, he should endeavour to take out as large a lump of earth each time as possible, and should throw this lump forward in one mass sliding his hand along the handle of the spade. Should the earth be hard it must first be broken up with the pick or crowbar.

7. *Revetment of parapet with lumps of earth and sods.* Clay thrown up into a parapet will stand at a steeper angle than mould and mould at a steeper angle than sand. But as the efficiency of the cover afforded by the parapet varies in proportion to the steepness of the interior slope, and as a parapet formed by merely throwing up the earth will not stand at a sufficiently steep angle, it must be assisted by forming a revetment. A revetment is formed by building the interior slope of rows of sods or large lumps of earth, and as each row is laid the remainder of the parapet should be filled up to the front with the more broken up earth, the work is continued in this manner until the parapet reaches the necessary height. Sods must be laid in single rows of alternate headers and stretchers, and should be placed with the grass downwards except the top row which has the grass upwards. The remainder of the parapet must be built at the same time as the revetment, for otherwise the revetment will not stand.

8. *Masking.* Artillery cover should be invisible to the enemy. Consequently if an entrenchment is in the open it must be made to appear like the surrounding country by covering the parapet, &c., with grass, straw, branches, bushes, sods with the grass upwards, sand or snow, as may be necessary.

9. *Overhead cover.* Overhead cover may be provided for the detachment trenches for the better protection of the detachments.

10. *Latrines.* Latrines are constructed as close as possible behind the battery, and are connected with it, if time permits, by communication trenches.

CHAPTER II.

11. *Tracing and construction of detachment trenches.* A distance of three paces (or two and a half paces for mountain artillery) is marked out on either side of the gun in line with the front of the battery. From the points thus obtained a further distance of four paces is measured outwards, and on this base of four paces a quadrilateral is marked out by measuring two and a half paces at right angles to the rear and three paces, at right angles to this line, inwards towards the gun. Two men with spades are told off to each of these trenches and must take out sods or lumps of earth for forming the revetment and throw the earth to the front to form the parapet. The sides of the trench must be made as steep as possible. At a depth of 1ft. 9ins. a step is left in the inside forward corner of the trench to make it easier to get in and out, and the remainder then continued to a depth of 3ft. 6ins.; a ledge 1ft. 2ins. wide is then left along the forward side of the trench and the remainder continued to a depth of a further 1ft. 2ins. making a total depth of 4ft. 8ins. The parapet to the front and side of the trenches is built to a height of not more

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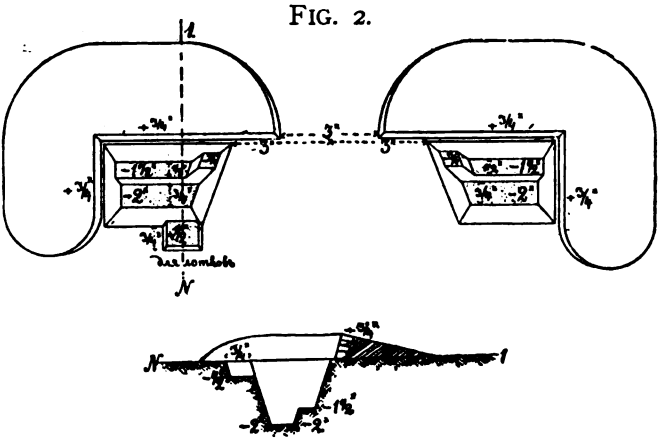
than 1ft. 9ins., the balance of the earth being thrown on the outer sides of the trenches to afford better cover against enfilade fire (fig. 2). If time permits a ledge 1ft. 2ins. in depth should be made along

FIG. 2.



tne rear side of the detachment trenches for the ammunition trays, but if time is not available for this the trays must be placed on the ground just behind the trenches. In easy soil if large shovels are used and the men work in two reliefs, the work should be completed in from one to two hours. With shielded guns, better cover can be afforded for Nos. 3, 4 and 5, by making a depression in the ground from 7ins. to 1ft. 2ins. in depth, near their positions in action. The earth taken out should be thrown to the front to fill up the space between the bottom of the shield and the ground; this, however, should not be done until the gun carriage has ceased to recoil.

12. *Tracing and construction of gun pits.* A semi-circle is marked out (towards the enemy) between the detachment trenches, with a radius of three paces, taking a point midway between the detachment trenches as the centre.

Four men with large shovels are told off to dig out the gun platform and should construct it as follows:—

For mountain guns not deeper that 1ft. 2ins.

For Q.F. guns of 1900 and 1902 pattern not deeper than 1ft. 9ins.

Howitzers, mortars, guns with threaded breech block not deeper than 3ft.

The forward side of the gun pit must be made as steep as possible and the entrance, at the rear, sloped off to the level of the ground in a distance of from 4 to 5 paces.

In ordinary soil, with large shovels and in two reliefs, such a platform for a field gun would take 1 to 2 hours.

18. *Cover for the wagon body.* Special cover is necessary for the concealment of the wagon body. In continuation of the left hand detachment trench mark off a rectangle of 4 paces by 2½. Four men are told off to this rectangle and sink it to a depth of 4ft. 8ins., leaving along the front side, at a depth of 3ft. 6ins. a step (in continuation of the step of the detachment trench). The bottom is then sloped off

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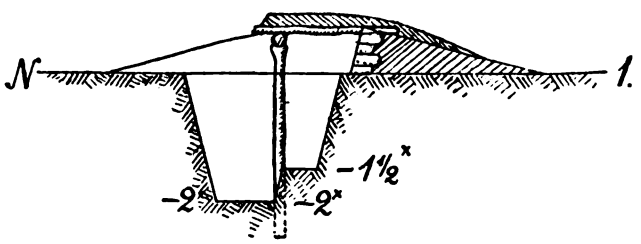
to the level of the ground at a distance of about 14ft. The earth taken out is thrown forward and to the left to form a parapet, which must not be made higher than 1ft. 9ins. Such cover for the wagon body may be constructed independently of the gun pit in some covered position, either behind or alongside the gun. In ordinary soil, with large shovels, the work will take from two to three hours.

14. *Semi-overhead cover.* To afford better cover from the enemy's shrapnel, semi-overhead cover is added to the detachment trenches (fig. 3). Into the bottom of the trench, and close up

FIG. 3.



against the front step, are driven two poles, so that 1ft. 2ins. is below ground and 7ft. remain above. Another pole is laid across these two, and a row of poles or boards from this pole to the top of the parapet, a layer of brushwood is then laid on top and the whole covered with earth to a thickness of twice the breadth of ones palm. The brushwood is necessary to prevent the earth from falling through the cracks.

15. *Overhead cover.* A couple of poles are laid respectively along the parapet and on the ground along the rear edge of the detachment trench; a row of poles or planks is then laid across the trench with their ends resting on these two poles and the whole is finished off with brushwood and earth as described in (14). The supporting baulks should not be less than 2½" in diameter, and the planks not less than 1¾" thick. To enable the men to get in and out of the trench with ease the cross planks must not be laid within a couple of feet of the inner rear corner of the trench.

16. *Communication trenches.* To ensure freedom of movement between the guns, the detachment trenches are connected up by means of communication trenches. These trenches should be 4ft. 8in. deep and one pace in width at the bottom; the earth taken out is thrown up into a parapet 1ft. 9ins. in height. Any superfluous earth is thrown to the rear. To enable the battery to advance freely to its front, sections may be left unconnected with one another.

If time is available and it seems advisable communication may be established with the rear by means of similar trenches. They may be led in any direction, but must on no account interfere with the free movement of the battery, and must be so arranged that the enemy cannot enfilade them. For this reason they are usually built in the form of " zig-zags."

17. *Observation points.* For the successful conduct of fire it is

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necessary to watch the burst of the shell and to carefully follow the movements of the enemy, and for this purpose it may often be necessary to select special observation points for look-out men and for the officer observing the fire at some distance from the battery. These points must be connected with the battery by orderlies, telephone or signallers to ensure the speedy transmission of orders and observations, and must be so selected that the observers and look-out men can see all the ground to their front, and yet remain hidden from the enemy, the officer observing the fire must, in addition, be so placed that he can see at least one gun of his battery. It is obvious that cover will often have to be constructed at these observation points. If the observation point is on high ground cover is afforded by digging a hole the depth of a man, leaving a step at such a height, that by standing on it, all the ground to the front may be seen. The observer's head is protected by sandbags, sods, &c.

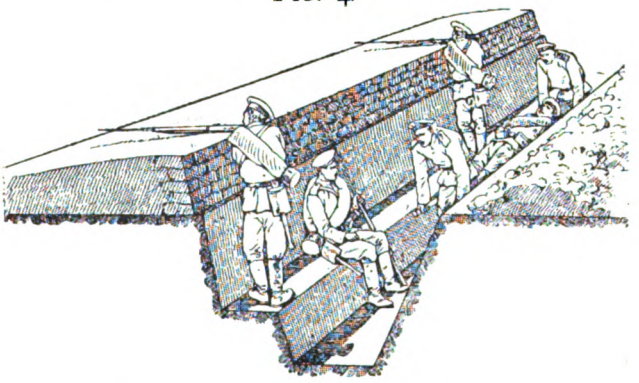
18. Semi-overhead and overhead cover for observation points is constructed as described in (14) and (15).

19. *Masking.* All artillery cover which is constructed in the open should be most carefully masked (8), and particular attention should be devoted to masking observation points which must necessarily often be constructed in the open.

20. *Latrines.* Latrines should be dug close to the gun pits and may be connected with them by communication trenches.

21. *Fire trenches* consist of a ditch and parapet (fig. 4). The

FIG. 4.



parapet forms a rest for the rifle, and in the ditch the men are under cover and can move freely from point to point. Notches for the rifles to rest in may be cut in the top of the parapet, and these notches when covered over are called loopholes.

Fire trenches may be constructed in the form of a trench alone, without a parapet; if it is desired to construct such a trench, the earth taken out must be spread over the surrounding ground. At long ranges it is very difficult to pick out the parapets of the enemy's trenches because they are carefully masked ,nothing as a rule being visible but the heads of the defenders or the loopholes.

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22. *Field works* differ from fire trenches in that they are completely surrounded by a trench and embankment, so that fire from them may be developed in any direction as required, not only from the front, but also from the flanks and rear; they are, moreover, surrounded by obstacles which prevent the enemy from rushing them.

The parapets of field works are made thicker and sometimes higher than those of fire trenches. When this is the case the extra earth required is obtained from an exterior trench, which also answers the purpose of an obstacle. Field works are constructed in the most important parts of the position, and must be carefully masked so as to render them invisible to the enemy.

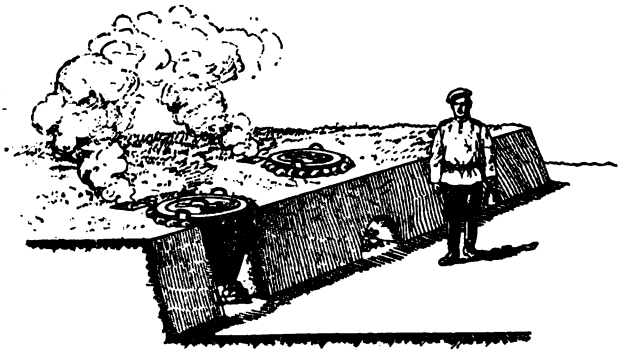
23. *Artificial obstacles.* Obstacles make it more difficult for the enemy to approach the field works and trenches and should usually be placed at a distance of from 50 to 70 paces from the latter, they should measure from 6 to 9 paces from front to rear. Obstacles are often covered by a parapet which protects and hides them from the enemy. The following are the most common:—

(i.) Abattis.
(ii). Wire entanglements.
(iii.) Military pits.

Military pits are often combined with wire entanglements.

24. *Field kitchens* (fig. 5). To construct a field kitchen a

FIG. 5.



trench should be sunk and on one side of it a recess cut rather larger than the kettle. The kettle is placed on stones in the recess, thus forming a space for the fire underneath it. The space between the kettle and the sides of the recess is covered with sods or stones. A chimney is made to lead off the smoke.

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The Transport of Artillery on Camel-back.

Translated from "Revue d'Artillerie" for September, 1909.

Mountain artillery is the only artillery possible in desert warfare, and wheeled transport being practically impossible in the Sahara, artillery matériel must be carried on the back of an animal.

The tracks, even the best of them, are only moderately good and many of them very bad. There are to be encountered, sand dunes with steep slopes, rocky plateaux more or less moving, covered with fragments of rocks, small pools with deep furrows and ravines cutting through them in every sort of fashion, and narrow passes running through precipitous cliffs are some of the many obstacles to be encountered and which the animals, even without loads, have some difficulty in traversing.

In case of necessity guns could be drawn on wheels over some places where the ground is hard, but the sand would soon destroy naves and axletree arms.

The artillery of the columns operating in the Sahara was at first carried on mules, but then as the sand became heavier and heavier, the employment of the mule became more and more difficult.

In this country where the wells are three or four days march apart and food and forage are non-existent a column can only exist by carrying its own convoy of supplies.

As this all embracing convoy is a necessary evil it must be of prime interest to reduce the impedimenta to the smallest possible margin.

For each mule, for a convoy of sixty days, one camel carrying grain and one carrying water would be required, so that we can at once see the necessity of replacing mules by camels for transporting artillery in the desert.

The Camel:—

In quite recent times, the camel was looked upon as a *quasi* fabulous animal, and even at the present time little is known about him.

Formerly it was believed by many that he could traverse the desert without either food or drink, this of course was an absurdity and a grave error.

In reality, the great *sobriety* of the camel is only apparent. He is no doubt capable of great exertions, but only on condition that the effort is not of too long a duration, and that at the end he is able to enjoy himself in a good pasture.

His capability for work is intermittent. After a period of marching he must have a time of rest to enable him to recover his condition.

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The camel requires very careful treatment, and his idiosyncracies and habits must be studied. He cannot be treated in a *regulation* manner like a mule, this treatment would be his death warrant.

Whatever may be his disadvantages, he has the saving advantage of being able to live on the country. He feeds on the woody plants which grow on the sand, and the masses of brushwood which they form constitute what are there called *pastures*. In a good *pasture* there should be several sorts of herbage, as the camel does not like to browse for long on the same description of stuff. He eats very slowly and for this reason he should be given plenty of time for his meal.

The question of water is also very complex. The intervals between which water is required varies with the heat of the weather and the amount of work done, and the distance apart of the drinking places. In the heat of summer, the camel must at least drink once a day, although in the winter time he can go much longer without water.

In a word, it must not be forgotten that if the camel is capable of covering three or even four days' march without food or water, he must only be called upon very exceptionally to undergo such privations, otherwise a convoy will very soon mark its route by dead animals.

The length of the marches and the halting places are fixed by the *pastures*. The Arabs allow their animals to move along at their own pace, and if the route is not entirely devoid of vegitation, they let them browse as they go along. The Touaregs fasten their animals in a string, so that they can more easily follow the bad tracks along which they move.

The pace at which camels march varies according to the loads they carry and the country they have to traverse, it seldom exceeds 4½ kilomètres (2¾ miles) an hour, and they must not be forced except under exceptional circumstances when, for example, a more or less level country without either water or vegetation has to be crossed. This is the absolute desert called by the Arabs *Temaheg*.

In the same way that the capacity of the animal to endure hunger and thirst has been very much over estimated, so his capability of carrying great weights has been much exaggerated.

The military authorities, when establishing posts, put out the transport for supplies to contract, which was taken up by the nomadic tribes who are usually very poor and naturally tried to make as much as they could out of the bargain.

They were paid according to the number of animals supplied, and the camels were then laden with loads of at least 250 kg. (5 cwt.), which would lead one to believe that this is the normal weight they should carry.

Natives who make journeys on their own account, never attempt to carry such weights, the utmost they carry being 160 kg. (rather more than 3 cwt.).

When the columns started from Tidikelt in 1900, the load for each animal was fixed at 120 kg. (2¾ cwt.), but unfortunately owing to the insufficiency of animals these loads were at once exceeded.

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Later experience showed that a camel load should never normally exceed 120 kg. (2¾ cwt.) or 3 maunds.

Harness and loads:—

The native harness is extremely simple and all materials for it are found in the country. It requires no skilled labour for repairing it as the camel drivers do the work that may be necessary themselves.

There are two descriptions of pack saddle, the *Haouïa* and the *Haredj*.

The tribes north of the Sahara usually make use of the former and those of the south prefer the latter.

The former consists of a long stuffed flat sausage shaped bolster folded in the middle. This folded part fits on the camel's hump, and on the rear portion there is a wooden cradle fastened round the camel with a rope. (See fig. e. *Haouïa*).

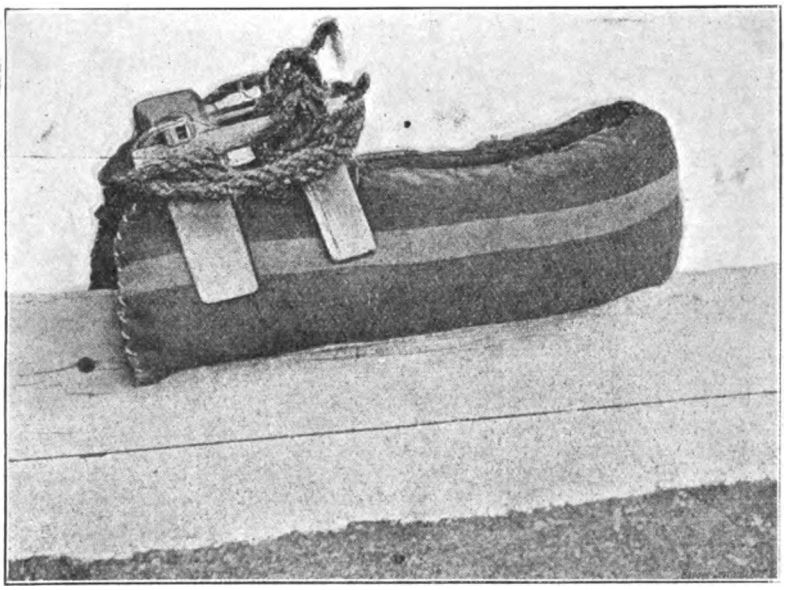

FIG. e.—Haouïa.

The other pack saddle consists of two thickly stuffed panels on which is placed a longer wooden cradle. (See fig. f. *Haredj*).

In either case the saddles are fixed on to the camels by means of two ropes, one passing round the camel just behind the shoulder, the other under the tail.

There is neither breeching nor breast plate.

The natives take the greatest care in loading up their animals.

The loads are put into sacks, one on either side of the camel, the camel is made to lie down and the sacks put on to the pack saddle.

The loading of artillery matériel on camels:—

The different guns likely to be employed in the desert are either

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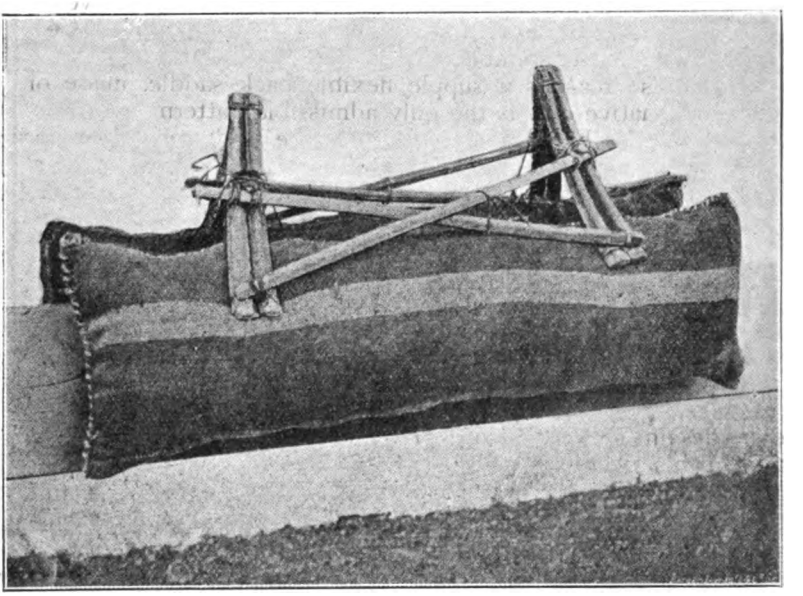

FIG. f.—Haredj.

mountain guns such as the 80 m.m. gun, or lighter guns, or machine guns.

The first essays were made in 1899 with the 80 m.m. gun.

The pack saddle for boxes consisted of wooded side bars with two pairs of wooden trees strengthened with iron placed on the side bars. The whole was placed on a stuffed arrangement like the native Haouïa. The ends of this being sewn together.

On the tree were loading hooks and leather thongs for keeping the whole on the camel.

These were much too heavy, weighing some 20 kg., and some as much as 45 kg. In fact they were all much too like mule packs.

The total loads amounted to as much as 270 or 280 kg., more than 5½ cwt., just double what they should be.

About the same time the Fourreau-Lamy expedition employed special pack saddles for carrying two 42 m.m. guns supplied by Hotchkiss.

The gun camel carried one gun and one ammunition box.

The gun carriage camel carried one gun carriage, one pair of wheels and a pole.

Notwithstanding the lightness of the matériel the loads were not well carried and had eventually to be carried on the top of the pack saddle, equilibrium being maintained by having skins filled with water on either side of the camel and as low down as possible.

Suggested method of carrying an ideal equipment:—

On account of the irregularities of a camel's back it is not possible to fit him with a rigid pack saddle.

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Further, after he has drunk or eaten, his stomach gets very much larger, and his sides also distend, hence a rigid pack saddle is on this account quite unsuitable.

For these reasons a supple flexible pack saddle, made on the lines of the native one, is the only admissible pattern.

It must also be borne in mind that the loads carried on a camel get very much knocked about as the animals often run against one another, and not infrequently their loads are pulled off, when it is most difficult to prevent the camel drivers from knocking these loads about.

Local resources do not permit of big repairs being carried out and on the march they must be reduced to a minimum.

Owing to the climate and illusage, wood rapidly deteriorates and for this reason iron and steel must be used almost exclusively on the pads or mattresses.

So much for the pack and cradle. As to the loads, these should be divided into two portions of equal weight, neither to exceed 60 kg. the total being 120 kg. (2¾ cwt.) or (3 maunds).

The length of the loads should not exceed 80 c.m. (32 inches).

Hence the gun should be in two pieces of 60 kg. each. The wheels should be of metal with broad felloes.

The ammunition boxes should be made entirely of metal with well rounded corners.

The weight of each when filled not to exceed 50 or 60 kg. and with projectiles of about 5 kg., each box would hold five or six rounds of ammunition.

The weight of the ammunition would then be about 40 kg. and that of the empty box about 15 or 20 kg. A box of sheet steel could be made to fulfil these conditions, having two hasps to keep it closed with hooks and chains for loading. The shape would be short, and high, with little depth so as not to stick out unnecessarily beyond the camel's sides.

The spare ammunition need not be carried in such elaborate cases, but in strong wooden boxes which could be put into the native bags. The boxes, when empty, could be used for firewood or for other purposes.

The equipment is fastened to the wooden cradles by means of special straps and chains with hooks on the latter. The straps being fastened round the gun or boxes which are kept at the desired height by means of the chains. Always keeping the centre of gravity as low as possible.

For carrying a heavy equipment which cannot be carried on the sides of the animal, there is only one possible scheme, and that is to place it on the top of the animal.

The following plan is adopted for carrying the 80 mm. gun and its equipment:—

The cradle for the pack saddles are made of acacia wood which grows in the country, combined with steel. The brass portions being cast by the native workmen in plaster of Paris, the metal being melted with wood charcoal.

The photograph (fig. g) shows the way these are constructed, the load being kept as low as possible on the animals' backs.

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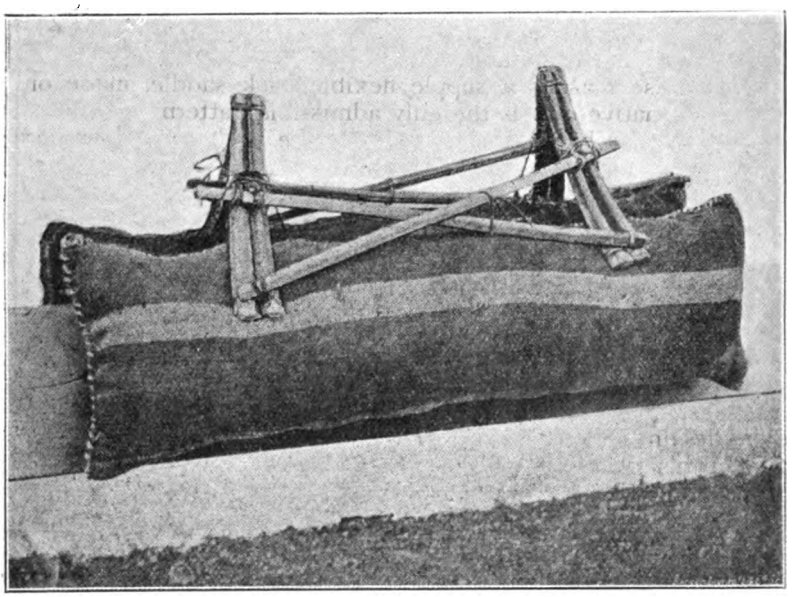

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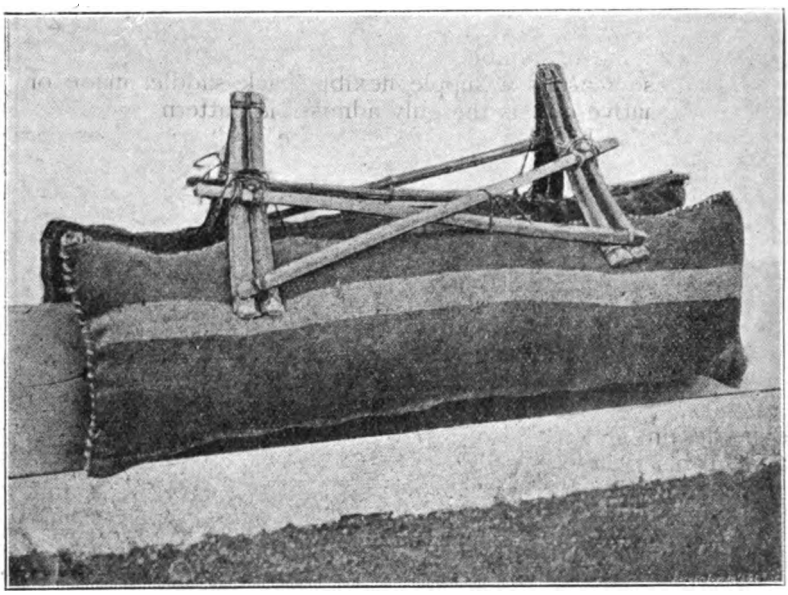

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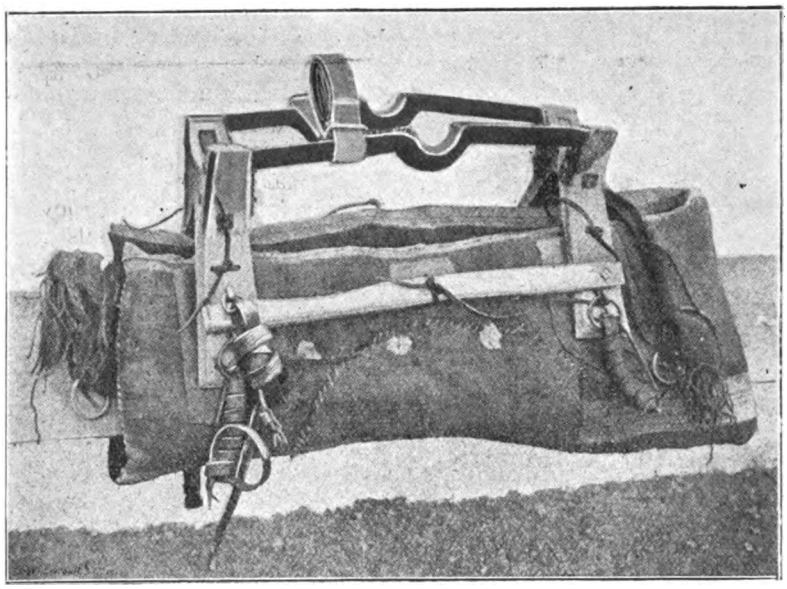

FIG. g.—Gun Saddle.

The loading straps for mule transport are used as far as possible.

The panels or mattresses are necessarily made thick and strong.

The complete saddle weighs 23 kg. (50 lbs.), which considering that iron is necessarily used in the construction, is not an excessive weight.

A. H. C. Phillpotts, Colonel, late R.A.

The German Heavy Artillery of the Field Army.

Translated from "Neue Militärische Blätter," No. 5, February 4th, 1910.

Many incorrect statements have appeared in the press as to the equipment with which the German heavy artillery of the field army is armed. The equipment consists of the 15 cm. field howitzer and the 21 cm. mortar.

The field howitzer is provided with a carriage of modern type in which the storage of ammunition, and seats provided for the transport of the detachments. The special task allotted to this artillery is the bombardment, prior to the infantry assault, of the enemy's positions and field fortifications. Mortar batteries would not be employed for this purpose, but their fire would be used chiefly for the attack and destruction of permanent works. On the other hand, howitzer batteries would be employed, together with the other arms on the battlefield, and would be of great support to the field artillery in the bombardment of the hostile artillery, and their fire would be certainly of very great importance in the preparation of the infantry assault against a hostile position, thoroughly prepared and well strengthened.

In the training manual of the foot artillery, the co-operation of

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heavy howitzers in the battlefield has been laid down for the first time, and its importance strongly emphasised. The Russo-Japanese war has shown the value of such co-operation; as the Japanese heavy artillery of the field army was employed with great success in the battle of Mukden.

Great mobility is one of the essential requirements of heavy field howitzers to carry out the tasks required of them. They must be ready to follow the troops not only on level roads, but also across fields at the trot, in order to be able to be of use just at the decisive moment. With a weight of only 2200 kg. in the case of the 15 c.m. howitzer, which recoils in its carriage, this condition has been satisfactorily fulfilled, not only in the last Imperial manœuvres, but also on other occasions the mobility of the field howitzer batteries has been remarkable. The advance of mortar batteries, equipped with much heavier guns, naturally is not such an easy matter, and is often beset by many difficulties. With the exception of the observation wagon, the usual method of advance of a mortar battery is at the walk. For this reason it is laid down expressly in the training manual that on bad roads infantry must assist the horses.

Particular attention is paid to the expenditure of ammunition of heavy field howitzers, and it is laid down that ammunition should not be wasted against field fortifications, which are held weakly or possibly not at all. The supply of ammunition is not very plentiful, and is distributed in only 8 ammunition wagons per gun, of which the first 4 wagons form "the firing battery," and the other 4 "the first line wagons." In each ammunition wagon there are 36 shell.

Orders as to the formation of mobile ammunition columns are still under consideration, and will be issued, when the question of the supply of ammunition has been thoroughly considered.

Practice against the French battleship "Jena."

No. 6, February 11th, 1910.

The very interesting practice carried out against the battleship Jena, which has been so much discussed, has come to an end somewhat earlier than was generally expected. It has been the greatest naval practice ever carried out in France. 550,000 francs were voted for this practice, and ammunition of every description was to be tested. All ammunition with which the fleet is at present equipped, and which the ships under construction will be armed with, and all ammunition still being experimented with, was to be included.

The practice consisted of two series. In the first series practice was carried out at long ranges (5000 to 6000 metres) with armour piercing shell filled with sand, in order to determine, whether any result could be obtained through penetration at these ranges; results which had not been obtained at the practice camp of Gâvres. The second series was carried out at shorter ranges with service ammunition, in order to obtain definite results as to their effect on the target.

The results of a new mark of 30·5 c.m. shell were awaited with special eagerness, as this shell will be supplied to the guns of the six ships of the "Danton" class, and is to replace all the armour piercing shell used now in the French navy.

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The new shell, which bears the designation "obus unique alourdi," has been constructed not only for the 30·5 c.m. gun, but also for the 24 c.m. gun. The weight of this shell for the 30·5 c.m. gun is 440 kg., compared with 340 kg., the weight of the old shell. The bursting charge of melinite is fixed at 12½—13 kg., and the length 3,44 calibres. On the other hand, the weight of the same shell for the 24 c.m. gun is only 220 kg., and a length also of 3,44 calibres; while the bursting charge is 6½ kg. melinite.

Official reports state, as they do so often, that the results have been highly satisfactory. Reports from other sources, however, are far less favourable. The new shells, in spite of many experiments during the last two years and continual alterations and improvements, are still satisfactory. More attention in particular must be paid to the bursting charge.

Besides this new shell, a new fuze W was also tested in the practice against the Jena, a fuze which had been repeatedly tested at Gâvres. Twenty 16·5 c.m. shell with 10% of bursting charge were fired with this new fuze.

The particular advantage claimed by this new fuze is, that the impact on an armoured plate only 4 m.m. thick is sufficient to set the fuze in action, while the present fuzes will only act on impact on a plate 13 m.m. thick. As to the results obtained, statements are contradictory. The general opinion however is, that the introduction of this new fuze will not take place at present.

A. E. A. Dobson, Lieut., R.G.A.

Why cannot the Howitzer be the chief gun of the Field Artillery?

Précis from "Jahrbücher für die Deutsche Armée und Marine."

The writer discusses the article by Major Auwers in the July number, in which the latter predicts that the howitzer will be the chief weapon of the field artillery of the future. The writer does not think, however, that this is altogether the case, that the howitzer is not superior to the gun in all respects. In the attack a certain amount of artillery fire will be required to keep down the fire of the defending infantry. The batteries to whom this duty falls will have to keep their fire directed on to the infantry and ignore that of the defending artillery, which will be dealt with by other batteries told off for this purpose. Howitzers are not adapted for shooting at infantry, especially a firing line lying down. Also, in the defence, howitzers are not at all adapted to deal with the rapidly moving targets, and fleeting opportunities which present themselves.

He admits that howitzers are superior to guns when it comes to engaging artillery, but even in this case, guns are better for that portion of a target which is not behind the shields, such as the battery commander, observers, &c.

In engaging unseen targets behind cover, high angle fire is certainly superior, especially if the targets are close up behind cover.

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But in this case the effect is very much at the mercy of chance. The writer does not think that the difference of the angle of descent of howitzer shrapnel bullets and of gun shrapnel bullets is sufficient to be taken into account, as regards shooting at detachments behind shields. The effect obtained is likely to occur through the apertures in the shields, and in this respect the gun shrapnel, with its flat trajectory and denser zone, is likely to be more effective than that of the howitzer.

As regards direct hits, the howitzer is, of course, superior. The splinters of its common shell may have some effect behind the shields, even when the shell bursts beyond the guns, as some of them fly back. But the annihilation of the hostile artillery will always be difficult to attain. One must rather try to render them innocuous, by disturbing the service of the guns, and preventing the supply of ammunition, and hindering observation by the thick cloud of smoke which the bursting shrapnel will form in front of the battery.

The writer considers that artillery will have done their work if they keep the hostile infantry from manning their parapet, and engage them with heavy shrapnel when they come up to it. The writer considers that the gun must undoubtedly remain the principal weapon of the field artillery.

H. A. Koebel, Captain, R.F.A.

The Russian 3 inch (7·62 cm.) Mountain Gun.

From Russian sources, by Captains K. Padiaur and A. Engel.

Translated from "Mitteilungen uber Gegenstände des Artillerie- und Geniewesens," No. 2, 1910.

In order to fulfil the conditions of a mountain gun, the equipment can be adapted for either pack or wheeled transport. To allow for large angles of sight and its low initial velocity, the gun has a large range of elevation. For speed, the gun is of recoiling type. In view of the heavy projectile (14·3 lbs.) and relatively light gun (218 lbs.), the carriage is very low and the trail long (6ft. 6in.).

Thanks to its narrow track (35½ inches) and light weight, the gun can travel on its own wheels on much narrower and steeper roads than a field gun.

The gun travels *normally* on wheels, and only in case of necessity on pack animals.

THE GUN.

Calibre	3 inches (7·62 m.m.).
Material	Nickel steel.
Construction	Jacket construction.
Obturation	By means of the cartridge case.

THE CARRIAGE.

Elevating gear	+ 35° to - 10°.
Recoil gear	hydraulic.
Running up gear	2 running up springs in the axle.
Maximum recoil	21¼ inches (539 mm.).
Wheel track	36 inches (914 mm.).

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AMMUNITION.

Weight of common shell and shrapnel	14·3 lbs. (6·5 kg.).
Cartridges	Fixed ammunition.
Initial velocity	968 ft./sec. (295 m./sec.).
Range of time fuze	4500 yards (4160 mètres).

The range table is also given.

When unlimbered, the trail eye folds back underneath the trail.

There is a small fixed spade at the end of the trail for use on hard or rocky ground. There is also a large movable trail spade for use on soft ground. When not in use, this spade is folded back above the trail.

The gun recoils in the cradle, and the cradle has two recoil cylinders, one above and one below the gun. Instead of trunnions, the cradle has two bearings through which the axletree passes. The wheels are fixed on to the axletree arms by two caps.

There is a control plunger for regulating the run-up.

The running-up gear consists of a spiral spring in each half of the hollow axletree. At the outer end of each spring is a movable piston with a roller attached. Another roller is fixed to the inner end of the spring cylinder (in the hollow of the axletree). A cable passes over the rollers, one end being fixed to the bed of the inner roller, and the other end being hooked on to a hook at the rear end of the gun. On recoil the springs are compressed by the pistons being drawn inwards by the cables. On the springs re-asserting themselves, the gun is run forward again. The springs have a certain initial compression so as to be able to run the gun up at all angles of elevation.

There is an arrangement on the elevating gear to attract the attention of the detachment when an elevation of 25° is reached. For elevations above this, a hole has to be dug in the ground for the breech end of the gun which would otherwise strike the ground on recoil. On further turning the elevating handwheel, an elevation of 35° can be reached.

The gun has also got a traversing gear.

For pack transport the gun forms five loads:—

The gun	1 load.
The cradle	1 load.
The trail	2 loads.
The wheels	1 load.

The wheesl are carried on a special type of pack saddle which converts into a riding saddle. All other loads are carried on "universal" pack saddles.

The limber forms two loads:—

Axletree and frame	1 load.
Wheels and jointed pole	1 load.

Two iron ammunition carriers containing five rounds each also form one load.

One pack animal is also probably required per section to carry the shields.

T. C. Newton, Lieut., R.F.A.

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Mobile Defence Armament in Minorca.

TRANSLATED FROM THE "MEMORIAL DE ARTILLERIA," NOVEMBER, 1909.

Captain Francisco Alvarez de Cienfuegos of the Spanish Artillery has an article in the above, headed "The mixed group of Minorca," dated from Mahon in August last. Though the general principles of the paper contain nothing specially new, they are sound and instructive, and interesting so far as Minorca is concerned.

The author states as his opinion that in the event of a European conflict, the first operation which will take place in the Mediterranean will be directed against the island of Minorca, the military importance of which is concentrated in the fortress of Port Mahon. He opines that whichever nation first possesses itself of this "jewel of the Mediterranean" will secure the control of the sea.

Minorca would be of special importance were the contest between England and France, and for either of them the possession of this port would be decisive; for England, because with Gibraltar and Malta she would be mistress of the Mediterranean; for France, because her important line Toulon—Algiers would be useless if Minorca were interposed as an enemy.

Hence the author urges that Spain should never lose sight of the fact that Mahon will be the objective of any operations directed against Minorca. He asks whether the elements which are accumulated in the Peninsula of the Mole are sufficient for the important part it would have to play, and he replies that the fortress of Isabella II. contains means enough to realise the purpose it was designed for, but only within the minimum limit. However powerful a squadron may be, the operation of attacking a coast fortress in front must be a risky and costly one, and the author quotes Mahon, Havana, Manila, Sebastopol, Port Arthur and Wei-hai-wei, amongst those which have fallen by a land and not by a frontal attack. "Mobile defence," therefore, becomes a necessity, and in this article the author confines himself to a study of this special means of defence, as applied to Minorca in particular.

Captain Cienfuegos lays down the usual requirements for mobile armament, viz., that it should be able to co-operate with the various arms available and be ever ready to march at short notice to any threatened point, and able to open a powerful fire on an enemy, whether attempting to disembark troops, or preparing to advance on Port Mahon.

It is necessary to impress on all concerned the immense value of initiative and early intelligence of the enemy's plans, as well as of a perfect knowledge of the ground—especially in the case when an enemy is in superior strength and the elements of defence (as they are now in Minorca) are exiguous.

The author insists on the danger of once allowing an enemy to disembark and expecting to defeat him on a selected position.

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Numerous examples could be quoted of disasters which have resulted from this policy. There is no position, however advantageous, which can compare with that which is offered to the defence at the actual time of disembarkation.

The author who has studied the late Russo-Japanese war, quotes from the Memorandum presented to the General Staff by the brilliant head of the Spanish Commission, the late Colonel Marquis of Mendigorria, who says that military historians will not absolve General Kuropatkin from the irreparable fault of judgment committed when he allowed the Japanese to effect a very strong embarkation of the 2nd Army at Pisetwo without the least resistance on the part of the Russians.

The author sums up the needs for a mobile defence under three heads :—

(a). To be at any moment in a condition to march to any point on the coast.

(b). To be able to open an effective and powerful fire on the enemy when attempting to disembark.

(c). To operate against forces of the enemy which may have landed and may be directing their march towards the interior, with ultimate designs on the port of Mahon.

For condition (a) great mobility is required and a thorough knowledge of the roads and country.

For (b) fire power is the great essential.

For (c) a combination of (a) and (b) are requisite, and sufficiént strength to cope with powerful antagonists.

These three conclusions may now be grouped in two under, viz.—

1. Material.
2. Ground.

After considering the requirements of a typical weapon for the purpose, and bearing in mind that fire and shell power are wanted as well as mobility, the author recognises that one single piece will not produce all that is wanted, and he, therefore, votes for a powerful and relatively mobile siege gun and for a lighter and more mobile field gun.

He occupies himself in the present paper with the latter which constitutes the armament allotted permanently to the troops told off to mobile defence. This, given in the opinion of the author, can be no other than the quick firing field gun, and it is no use trying to look for any superior type without sacrificing essentials.

At the present moment the movable armament in Minorca is a mixed group consisting of field and mountain guns. Captain Cienfuegos is unable to accept this as the best state of affairs. He calls the mountain gun an inferior field piece which owes its existence to the conformation of ground. It is a necessity in certain countries where wheeled transport is not possible. It may temporarily take the place of field guns, but can never be as efficient, because though it serves to distract and disturb the fire of the enemy, it cannot effect decisive results, and it must do this when employed as movable coast defence armament, if it is to be of any use at all.

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Minorca does not need mountain guns according to the author of this article, because it is neither deficient in resource, very mountainous, or badly off for communications.

In the words of F. Hernandez in his " Geography and History of Minorca," " the island is low and uniform without rivers to intersect it nor any mountain ranges traversing the country." The highest hill is some 1000 feet (the Cota del Toro). As regards resources, the island is of course small, but the following figures are interesting and speak for themselves. The superficial area of Minorca is 668·5 square kilometres, which contain 10 townships and 1141 large farms. The total number of inhabitants, according to the census of 1900, is 37,576, giving a density of 56·2 per square kilometre, which is greater than in any of the islands of the Mediterranean, and exceeds that of Iceland, Scotland, Sweden, Roumania, Finland, Portugal, and Spain. The island is inhabited throughout its whole extent.

Amongst the products of the island wheat comes first, the annual harvest being some 84,000 hectolitres. The pasture is very rich and abundant, and in the years 1901-1905, some 4545 cattle and 7377 sheep were exported, or a mean of 900 and 1500 annually respectively.

As regards the third point, viz., roads and communications, the island is well formed in this respect. There are seven main roads of which one crosses the island from East to West and is 44·5 kilometres in length. There is to be a road made shortly 25 kilometres long from Port Mahon to Fornells, and surveys are being made for two others. There are over 100 minor public roads, and any number of private roads. There is thus no lack of good communications.

The author argues at some length that the mountain gun is, therefore, out of place in Minorca, and that there is nothing to limit the use of the field gun, especially if the services of artillery scouts are properly utilised. He claims that it has been proved by experience in Minorca that the field artillery gun can be moved to all the most important landing places which might be utilised by an enemy, and could get there much quicker than could the mountain guns, above all if the distances to be got over are of any consideration (notably the beaches at Son Bou, Fornells, Addaya, all critical points).

Captain Cienfuegos claims equal advantages for the field gun even in the second phase of the action when the guns are engaged in the contest. The ground in which they would be emplaced has been carefully studied and is in fact manœuvred over freely in peace time, and he concludes his interesting paper by urging his readers not to underrate the previous characteristics of the field gun, so powerful, adaptable, and mobile; let them devote the greatest attention to study of the ground and recognise the immense value attached to it; let them study positions, lines of advance and retreat, tracing out across country those which may be necessary in the not very probable case that they may not be able to avail of the existing extensive network of roads; let them remember that they are in their own country and that time does not press, and that even nature is on their side, facilitating their efforts in the most extraordinary manner.

J. C. Dalton, Major General, R.A. (retired).

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A new Automatic Rifle for Infantry.

Translated from "Revue d'Artillerie," February, 1910.

In the February, 1910, number of the "Revue d'Artillerie" appear the conditions which a new automatic rifle for the infantry should fulfil, both for the English army, and for the French.

It is useful and instructive to compare the conditions set forth by both Governments and the almost exact similarity of the conditions required in both cases.

To commence with France.

For some years the adoption of an automatic rifle has been under consideration in France as in other countries.

In order to justify either a partial or complete change in the armament of the infantry, the new rifle should as a weapon for war present some very marked superiority over that in use at present.

So far the types which have up to now been produced do not by any means show any great superiority over the present rifle, not in fact sufficient to justify their consideration.

The conditions which a weapon of this sort should fulfil are fully set forth in the following detailed programme which was drawn up by the special committee on small arms. The Minister of War has decided that they should be promulgated to all services who are interested in the study of the question.

The conditions are the following:—

1st. The loading arrangements of the weapon. The rifle to be loaded by means of a loader or some other similar system (five cartridges at most).

The principle of automatic loading to be adopted allowing the contents of the loader to be discharged by touching the trigger, but without removing the rifle from the shoulder.

The weapon must be capable of being used, not only as an automatic rifle, but also as a simple repeating rifle. It must also allow of being fired as a single firer shot by shot.

2nd. Handling of the rifle. It must be of simple construction, strong, and easily kept in repair under all circumstances. Mounting and dismounting of the weapon to be done as far as possible by hand, without tools.

The breech mechanism to be protected against rain, dust, mud, &c.

The fouling arising from continuous firing, carried out under the normal conditions of war, must not interfere with the regular working of the mechanism.

The ejection of the cartridges must not be in any way objectionable either to the firer himself or to those near him.

The soldier must not be in danger of having his hands burnt from the weapon heating during continuous firing.

Unloading must be possible at any moment without loss of time.

Finally the rifle must allow of the use of blank ammunition at drill and manœuvre.

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3rd. Weight of the rifle. Must not exceed 4 kg. 200 g. with the magazine empty and without bayonet, while the recoil at the same time must not be excessive.

4th. Weight and dimensions of the ammunition. The calibre of the rifle must not be less than 6·5 m.m. With this proviso, the ammunition should be as light as possible.

5th. Length of the rifle. The rifle must be long enough to permit of its being used in double rank.

With bayonet fixed it must not be much shorter than the weapons at present in the service.

6th. Sighting. It must be supplied with sights which will allow of aiming without any preliminary arrangement at point blank ranges.

There must also be another sight which will allow of firing at the highest ranges.

7th. Rapidity of fire. At least twenty rounds a minute from the firing position.

8th Accuracy. The weapon must at least be as accurate as that with which the troops are at present armed.

9th. Trajectory. At a range of 800 m. the trajectory must not be higher than 1·60 m. At medium and at extreme ranges, at least up to 1500 m., the bullet must be as steady in flight as that of the arm at present in use.

10th. Penetration. The penetration should be as great as possible and at least as great as that of the rifle at present in use in the army.

England.—Programme laid down by the War Office for the guidance of a Committee formed in November, 1909, with a view to selecting an automatic rifle for the British Army.

The Committee was composed of:—The Commandant of the Staff College as President. Members being:—The Commandant of the School of Musketry, Hythe; the present and former Chief Inspectors of the Small Arms Factory; a member of the Small Arms Committee, and two officers of the General Staff.

All the small arm factories in England were invited to send an automatic rifle and 300 rounds of ammunition to the Director of Artillery by the 1st of May, 1910.

The following are the conditions which the rifles sent in must fulfil.

1st. Simplicity and strength.

2nd. The mechanism to be protected from rain and dust, and generally to defy damage from the weather.

3rd. Absence of fouling during continuous firing.

4th. Must be easily kept in repair and capable of being taken to pieces with as few tools as possible.

5th. Repairs to be few and cheaply executed.

From the ballistic point of view, the following conditions are insisted on:—

1st. A pointed bullet of from 9·75 gr. to 11·7 gr., with a calibre of 6·85 m.m. to 7·10 m.m.

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2nd. The maximum height of the trajectory at a range of 730 m. (800 yards) to be less than 1·60 m.

3rd. The maximum pressure in the bore of the rifle to be under 3300 kg. per square cm. at a temperature 27° Centigrade (80° Fahr.).

4th. The weight of the rifle without bayonet and with an empty magazine to be less than 4·300 kg.

No condition is imposed as to the length of the rifle.

The weapon to be capable of being used at pleasure, either as an automatic rifle, or as a magazine rifle, with five rounds in a clip or charger. In this latter case the bolt or block must work easily and without unnecessary force being required.

There must be one round for each pressure of the finger on the trigger, and there must be some conspicuous method of showing when the magazine is empty.

Several conditions are laid down as to safety.

At the moment of firing the block or bolt supporting the base of the cartridge must be locked to the barrel or to some part securely attached to the barrel.

It must not depend on friction, inertia or the pressure of springs, to resist separation of the breech bolt or block from the barrel on discharge.

Moreover it must be impossible to fire the rifle until the locking is complete, and an efficient safety device must be provided to prevent the rifle being fired when this device is in use. When the latter is out of action the rifle must remain cocked and ready for firing.

The rifle must be capable of being used as an automatic rifle with the bayonet fixed.

And the bayonet must be fixed, not on the barrel, but on the continuation forward of the stock.

On comparing these two specifications, the French and the English, we see how practically identical they are as regards their principal items.

The conditions as to serviceability are the same.

The calibres are to be respectively greater than 6·5 m.m. (24 ins.) and between 6·85 m.m. and 7·10 m.m.

The height of the trajectory must be less than 1·60 m. at 800 m. and 800 yards respectively.

The weight of the rifle empty without bayonet is not to exceed (9 lbs.) 4·200 kg. and 4·300 kg., respectively.

These requirements are entirely reasonable, for it does not appear worth replacing the rifles of 6·5 m.m. or 7 m.m. of recent construction, or the rifles of 8 m.m. of older make with a new bullet, by an automatic rifle unless its ballistic properties were superior.

A. H. C. Phillpotts, Colonel, late R.A.

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Open and Concealed Positions.

By Balck, Colonel.

Translated from "Neue Militärishe Blätter," Nos. 8 and 9.

Positions may be divided into:—

1. Positions in the open:—
   When the guns are not concealed from view, and when they can be layed with the open sights.
2. Semi-concealed positions:—
   When the guns are covered from view, but are so near the crest that they can be layed for line by a layer standing at the gun or upon it and in which the material, and a man on foot, are concealed.
3. Concealed positions:—
   When the guns are behind cover such that the guns cannot be layed for line from the position and in which a man on horseback (2·4 metres) is concealed, and when the guns are so far withdrawn that the flash is no longer visible.
   As in France the unlimbering of the field gun takes two minutes, the preparation for action is in consequence delayed, and so the concealed position is generally favoured.
   The nature of the position, whether semi-concealed or concealed, is determined by the amount of cover provided.

The field artillery, when the tactical situation permits, will fire from concealed positions. On the other hand, the foot artillery will fire always from concealed positions, as with them there is more freedom in the choice of suitable positions. Rapidity and accuracy of fire forced the Russian and Japanese artillery to fight for the most part from concealed positions. This was possible, for it was only a question of fighting fortified field positions. Yet in spite of this both sides felt the want of shields, and even after the provision of shields, the value of concealed positions did not depreciate. Shrapnel fire has little or no effect against "shielded batteries," but its effect can be directed against the supply of ammunition and movements in the battery. To fight this type of battery successfully, common shell or high angle guns must be employed. Careful ranging is necessary in this case, and is only possible if the target, or smoke or dust thrown up by the shell is directly visible; otherwise a process of "searching and sweeping" must be emplyed. The nearer the hostile guns are to the crest, the sooner will this method be successful.

The Russian and French artillery have a great preference for the concealed position, and we would only be giving ourselves un-

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necessary difficulties, by fighting them from open positions, and, moreover, would give the enemy a chance of bringing an accurate fire with percussion shrapnel to bear on us. On the contrary we must endeavour to force the enemy to leave his concealed position. Firing from concealed positions increases the difficulty of estimating the strength of the opposing artillery, and will make it harder for the higher commanders to estimate the strength of the opposing force.

The perfection reached in modern sights makes laying and a change of target easier to carry out, but it is a great disadvantage for guns to have dead ground on the slope on the other side of the cover, which cannot be kept under an effective fire. In such cases an infantry escort is required in front, and it would be difficult for the guns to support the infantry from their concealed position.

The battery commander, while carefully watching the progress of the fight, directing his fire against the moving targets of field warfare, must observe, however, the results of his shooting, and control the fire of his battery. Very often it is most difficult for the battery commander to carry out all these duties by himself. Should the battery commander go some distance from his battery to observe, his direct influence over the battery is lost. What will happen if he is put out of action? On the other hand, if he keeps the command of the battery in his hands, the effect of his battery will depend on the ability of the observer sent out by him. In this case the battery commander has been well compared to a blind man. He is personally responsible for the command of his battery, fire discipline, and must regulate the expenditure of ammunition, obtain co-operation of all ranks, and combine observation and command in one person. In France, the battery commander both observes and controls the fire. In Austria, the fire control is transferred to the oldest officer in cases when observation must be carried out at some distance from the battery.

Rapidity of fire from a concealed position is perhaps possible from a single battery, but certainly not in the case of a more extensive artillery line; for observers will have great difficulty in picking up shots from their batteries, and without some method mistakes are bound to occur. The difficulties will be further increased if the battery commander is unable to conceal himself from the view and fire of the enemy, behind some natural cover or some screen, as a tree, shrubs, &c.; but is forced to kneel or lie down at his observing station, and naturally there will be less choice in the selection of suitable observing stations, from which a good view of the country can be obtained. In the case of a single battery a suitable observing station generally will be found close to the battery.

The further the battery commander is from his battery the greater will be the difficulties of fire control. It will be harder to picture the country from the point of view of the battery, and to estimate the amount shots are out for line, and inaccuracy will creep into the switch angles sent down of new targets, which appear at other ranges than that being fired at, at the time. Thus the necessity of careful training and complete arrangements beforehand is clearly seen.

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For signalling in results, the staff of an observing station must include two men. Flags are very liable to give away the position, and compared with telephones, signalling requires specially trained men. Communication with the brigade commander as well as with the battery must be maintained.

In the Russo-Japanese War never more than two to three batteries fired simultaneously from the same concealed position, and thus the difficulties were relatively small.

The employment of concealed positions will lead to the artillery being placed in groups at considerable intervals, and so the frontage[1] occupied in the fight cannot be limited, but will vary according to circumstances.

One will not always be in the favourable position, which the Japanese were on the Yalu, where their observing stations were on the high ground immediately in rear of their batteries.

The necessity of concealed positions must be recognised. Indirect laying is not the cause of difficulties, for this indeed is much easier to carry out than direct laying against targets at long ranges, but the chief difficulty consists in the efficient fire control of larger units.

In concealed positions care must be taken that projectiles will clear the cover in front, and this is particularly important when a change of target may be required against a target at a closer range.

There is no doubt that time[2] is required to open fire, but, on the other hand, the advantages of a concealed position are as follows: Possibility of opening fire unexpectedly, change of position can be undertaken, and supply of ammunition is an easier matter.

The cover afforded by a concealed position is of considerable value, as the losses of a battery in such a position amount to about one-sixth of that of a battery in an open position. The enemy practically will never be able to fix accurately the position of the battery as far as line and range are concerned, and accurate fire is out of the question.

The disadvantage of a concealed position is the difficulty of a change of target, in the case of moving targets, when moving across the front of the battery, and when no limit is laid down as to the front of country to be engaged by each battery.

The most favorable concealed position seems to be one which

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[1] On the Schaho every battery of the 3rd Siberian Army Corps and of the 10th was employed (168 guns along 14 km) average frontage 600 metres; in 1870-71, average frontage was 270 metres; now along a front of 5,000 metres, the frontage will average 180 metres.

Lieutenant Sluscharenko with two batteries at Liau Yan on the 30th and 31st of August, engaged two hostile groups of 24 and 12 guns at ranges of 4,200 metres and 4,500 metres. Observation was carried out at 800 metres from the battery. In both cases the commander retained the control of his battery and observed, although at some distance from his guns. On the 30th the position of the guns was seen from their flashes and by the sand thrown up on firing. On the 31st the position was considerably improved, and the Japanese had to resort to "searching and sweeping."

[2] The Dutch carried out trials with (*a*) 4 (*b*) 6-gun battery. Laying out the line of fire (*a*) five minutes; (*b*) seven minutes. Ranging with one gun against a visible target represented by a gun, range 3,000 metres, until a short bracket of 25 metres was obtained, 6¼ minutes deliberate fire, correcting the line 8¼ minutes. Effective firing, total (*a*) 15 minutes, (*b*) 17 minutes from the time of firing of the first gun.

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lies 200 to 300 metres behind cover (the Russians speak even of 400 metres). The battery will generally be able to drive up into position, is very soon ready for action, has great freedom in its movements, and the supply of ammunition is easier. If necessary the teams can be hooked in quickly and an advance made into an open position. Firing from concealed positions can be carried out against fixed targets of the defence, if the enemy is to be deceived as to the strength and intentions of the attack. The concealed position must be left, if it is a question of sweeping the foreground with an effecitve fire, and if moving targets are to be quickly engaged, and the infantry to be supported. In contrast to this, the foot artillery, and heavy field howitzers, will fire almost always from concealed positions. They have time for the preparation for opening of fire, their targets are fixed, and they are not limited in the choice of observing stations. The advantage is gained that their opening of fire will be unexpected, and will make it more difficult for the enemy to locate targets, conceals the strength of the troops and the object of the commander, and makes the supply of ammunition and change of position easier.

Heavy batteries with flat trajectories, which have to engage moving targets, must almost always fire from semi-concealed or open positions. Effect is more important than cover. In cases requiring quickness in opening fire, and rapid changes of target, namely against moving targets, the semi-concealed or the open position must be used.

If several targets have to be engaged by one and the same battery (in contrast to the French, who distribute targets to their groups), then the semi-concealed positions must be regarded as the chief fighting position of the artillery. Its advantage consists, that the battery commander can observe and direct the fire, and the battery can be brought quickly into an open position. It is of less importance, for the position to be withdrawn absolutely from view of the enemy, but much more important that the opening of fire will surprise the enemy, and that every change of target will be carried out quickly and without loss. With the introduction of fixed ammunition for the German artillery, there has been a considerable decrease in the flash from the muzzle. Every endeavour must be made to avoid giving the enemy any idea of the line, precautions in reconnoitring and driving up (the minimum of dust being thrown up), unlimbering and advancing without noise; and if time is available, the line will be picked up from one gun only with the dial sight in the raised position. Dust caused by firing can be avoided by watering the ground.

Every use should be made of screens and cover, and as far as possible choice of most unlikely positions for the artillery from the enemy's point of view. Entrench to minimise losses.

From the above remarks the necessity is seen of the introduction of observation wagons[1] (with ladders and shields), which, however, must not give away the position of the battery.

[1] **The Rheinish hardware factory has constructed an observation wagon, total weight 1,756 kg., and a ladder 10·5 metres in height. An observation ladder constructed by the same firm 5·6 metres in height with an armoured shield, weighs only 9·2 kg.**

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It is too unreliable to rely upon too elaborate means of communication; orderlies at intervals apart and signalling will suffice for the transmission of observations. For the communication of orders, telephones seem to be at present the most perfected means of communication, but may break down in the whirl of the battle.

A. E. A. Dobson, Lieut., R.G.A.

The Parsival Air-ship.

Translated from "Russki Invalid," No. 22.

A short time ago Major Parseval gave a lecture in Berlin on his airship; there were present many officers of the highest rank, and representatives of the diplomatic, financial and commercial world.

The Parseval airship was designed in 1902, but it was only in 1906 that, after many alterations, it was possible to exhibit it. In spite of a few slight mishaps this ship even then showed the qualities which characterises it at the present time; good speed, stability, facility in manœuvring both in horizontal and vertical planes, durability, and safety in descent.

At the present time the ship is fish-shaped with a blunt head and tapering tail; behind, there are three balancing planes, which diminish the rolling of the ship during flight, they consist of frames of tubular steel on which some cloth material is stretched. At each end of the ship large air bags are fitted inside, which serve a double purpose; in the first place they serve for filling the balloon with air in case of an escape of gas; this allows of the envelope being always fully stretched without folds, and besides, gives the balloon such internal stiffening that it is possible to hang a heavy car to it, without destroying its shape.

The secondary use of the air bags is in regulating the inclination of the axis of the ship. This is accomplished by filling one bag with air to a greater extent that the other. This gives the ship an upward or downward inclination.

The airbags are filled by means of a ventilator, the opening or shutting of which is done from the car by means of cords.

To avoid bursting the balloon by too great an expansion of gas, there is an apparatus which allows first the expulsion of all the air in the bags and afterwards the opening automatically of a special gas valve.

The ship is easily transported as the dimensions of the car are small, and the balloon is easily packed up.

In the case of an unpremeditated descent a ship of 4000 cubic metre capicity can be packed up on two carts.

The car is made of steel; in front a place is built for the commander, behind him are seats for passengers, and lastly comes the engine with its propellers.

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The propeller consists of a large drum with 3 or four sails made of cloth stuff with weights attached. On the propeller revolving, these sails, owing to the centrifugal force assume the form of a screw. On the last occasion some new semi-rigid blades were tried.

The method of suspension of the car is one of the features of this air-ship. It is not rigidly fastened to the balloon portion, but can within certain limits swing like a see-saw. By this arrangement, the fore portion of the balloon is prevented from rising when the propellers work.

Lateral direction is given to the ship by means of a rudder similar to that on a vessel.

While in motion the ascent or descent of the ship can be accomplished by means of the action of the wind meeting it, without using either ballast or valve. The ordinary descent to earth is accomplished without any shock, the ship approaching the earth only sufficiently near to allow the crew to check it by means of an anchor.

Up to the present time Parsival has constructed:—

One small sporting airship of 1200 cubic metres—the smallest of any that have been made any where so far; it has only one air-bag.

1 Military airship for Austria of 2300 cubic metres.

1 " " " " 4000 "

1 Airship for the Imperial Aero Club of 3200 cubic metres.

All the ships have one engine and one propeller. Although for military purposes it would be better to have ships with two motors, both those named above have done very well with only one.

The Austrian airship has been especially successful, having attained the splendid (for its size) speed of 12·5 metres a second (about 27 miles an hour).

The German ship is a little faster, and possesses a greater range of action.

However, at the present time, there is observed a tendency not so much to prolong the duration of flight as to increase the speed.

Parsival considers the best of his ships to be the one that was shown at the International Exhibition at Frankfurt, and which marked a notable advance, both as regards speed and reliability. It was of 6700 cubic metres capacity, and had two motors of 100 (horse power?) each, developing a speed of 14·2 metres a second; it had two propellers 4 metres in diameter, which can also give a reverse motion. Thanks to this, the ship was able to manœuvre in the narrow confines of the square at Frankfurt. On account of the quiet and smooth working of the motors, sitting in the car was quite pleasant, and the passengers became quite confident of its safety. During flight the balance was perfect.

One long flight was especially interesting: Frankfurt-on-the-Main, Nuremberg, Augsburg, Numchen, Stuttgardt, Frankfurt, from the 12th to 16th October, 1909. During all this time the airship remained in the open air, and rode out some stormy and rainy nights at anchor. On the completion of the journey the envelope had hardly lost its shape at all.

During the summer this ship completed 67 flights, amounting all together to 145 hours, and in this time it covered 5200 kilometres and carried 597 passengers.

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The most important technical result was that it showed that the "non-rigid" system was perfectly suitable for balloons of so great a capacity as 6700 cubic metres.

At the present time this ship is in the possession of the military authorities; it is proposed to effect still further improvements.

Passing on to the comparison of different types of ships, Major Parsival made appreciative mention of the Zeppelin airship alone.

The Zeppelin ship, in consequence of its slowness cannot compete with other ships in short flights.

In the opinion of Major Parsival, his ship possesses the following advantages:—

It is very light, as it possesses no heavy framework.

It is very reliable in its action, as it is composed of the smallest possible number of parts.

It is very safe when descending as all the immovable parts are together in a small space.

It is very handy in turning.

Under ordinary conditions it has great speed and a great radius of action.

A. E. Harrison, Major, late R.A.

Automobile Development in Germany.

Translated from "Russki Invalid," No. 23.

We select from the new number of the Journal "Militär Wochenblatt" the following remarks on automobile matters in Germany:—

At the last trial run organised by the War Office in May and June, 1909, eleven traction motors with wagons attached and a total load of 6 tons were started out.

With an average daily run of 120 kilometres, each of these trains consumed 70 kilograms of oil and fuel at a cost of about 19 shillings.

To drag these loads of 6 tons 120 kilometres would have taken 6 pair-horsed wagons 4 days; and the horses would have consumed 288 kilograms of oats, at a cost of £3/11/8.

In our time the introduction of an universal pattern of wheel has greatly increased the mobility of artillery, as it has facilitated the replacement of a wheel.

From the 1st April, 1910, all the light motors subsidised by the War Office will be compelled to have one single type of wheel of an uniform size and with rubber tyres of an identical pattern. Solid rubber tyres have now been perfected to such an extent that, according to the Daimler firm, they have tested them with the traction motor itself over fifteen to twenty thousand kilometres, and with the train of wagons from 20,000 to 30,000 kilometres.

The wear of rubber tyres with the traction motor and wagons is estimated altogether to cost 5½d. per kilometre; this makes nearly a fourth part of the average yearly upkeep of a light traction motor.

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The Ganz Automobile Company have tried to relieve the wheels of the traction motor so that they might have only the friction which is unavoidable on the movement of the motor. The weight itself is placed on a special platform which can be moved to a certain extent along the motor; this platform rests on two high wheels shod with iron. This idea is as yet in a state of development, but in any case such a relaxation of the pressure on the wheels must certainly protect the rubber tyres to a great extent.

Automobiles for passengers are provided with phneumatic tyres. In addition to the high price they have the disadvantage of being easily destroyed. In order to save the time required for putting on the tyres, the firm of Adler at Frankfurt have brought out the Alpha removable rim. The rim of the wheel is in two parts. The tyre is attached to the exterior rim and, in case of damage, is easily removed with it from the inner rim, by the releasing of a special sort of clasp. A spare rim with a tyre attached is then drawn on and tightly fixed to the inner rim by means of the clasp. The substitution only takes a few minutes.

From the 1st January, 1907, to 1st January, 1909, the number of motor cyclists increased by 33 per cent., and the number of quite light automobiles (up to 8 H.P.) by 84 per cent. The growing demand for small automobiles has induced the Imperial German Automobile Club and the Union of German Moterists to organise from 1st to 4th May, this year, an international reliability trial of these automobiles. The daily run will be 300 kilometres. The War Office attach great importance to these automobiles, as they are easier to manœuvre with a column on the march than the bigger ones, but can nevertheless carry 1 to 3 staff officers. Adler's small 2-seated cars cost at the present time £280, but with the increased demand, it will become cheaper.

These reliable cars must quite supersede the dangerous motor-cycles with trailers. It is proposed thoroughly to test these small cars this year on manœuvres. They will be under the control of members of the Volunteer Motor-cycle Corps, the organisation of which has been finally established.

The members of this Corps are called " Schnellfohrer " (an untranslatable expression for fast drivers). They cannot be chosen from the number of those liable to military service, and do not receive a military training. In case of mobilization, the motor cyclist will receive the price of the motor-cycle he produces, 15 guineas for his uniform, and 1s. 7d. a day for upkeep of clothing, Government lodging, subsistence, medical attendance, and daily pay 15s. 10d. at home and 19s. abroad. He is armed with a Government automatic pistol. At last year's manœuvres there were 100 motor cyclists.

The German Corps of Volunteer Automobilists can muster after 5 years' existence 62 members, 42 of which attended last year's manœuvres with their own cars.

At their last meeting it was decided to admit as members those owning cars of 8 horse-power instead of 10 as before.

The staffs of Army Corps are provided with their own automobiles, usually from the firm of Adler. They are from 29 to 50 horse-power, painted in grey, and designed for 6 to 8 people. They

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are provided with a folding table, electric light for studying charts, a speaking tube to the chauffeur, and a removable cover. They are driven by soldiers of the Automobile Corps.

A. E. Harrison, Major, late R.A.

Artilleristische Monatshefte.

Précis of Contents, December, 1909.

What lessons are to be deduced from the experiences of the East Asian War, 1904-5, concerning the employment of artillery in the field? By Blume.

The experiences of this war teach the following lessons:—

(a). Artillery must subordinate all other tasks to the support of the infantry advancing to the decisive attack.

(b). The fighting value of both arms has lastingly improved.

(c). A superiority in numbers of guns at the decisive moment, at effective ranges, offers the safest guarantee for the closest and best support of the infantry.

(d). Reconnaissance is indispensable for the proper employment of artillery in order that it may effect complete co-operation with the other arms.

(e). Quick firing guns are compelled to expend frequently an extraordinary outlay of ammunition.

This expenditure must be very carefully watched and checked so as to avoid waste.

(f). Indirect firing needs perfecting in order to use covered positions to better advantage.

(g). The efficacy of field artillery must be improved by means of high angle fire guns and by heavy artillery.

(h). The Russian artillery throughout failed in their chief task of supporting their infantry; they did best when it was pushed up regardless of losses during the first fights of the campaign.

The Japanese artillery accomplished their task much better in spite of their less effective weapons.

(i). An extraordinary care on both sides was taken concerning the employment of artillery; so much care that the infantry very often was not supported properly. An examination of the losses shows that this very great care was overdone. Out of every 100 killed and wounded, only 3% in the Russian list and 4·1% in the Japanese belonged to the artillery, whilst the German artillery in 1870-71 lost 4·8% of the total losses, in spite of the fact that they had a marked superiority over the French artillery. It can and must also be desirable that artillery supports infantry in future better than occurred in the East Asian War.

That will require a much bolder employment of guns.

E. H. Collen, Captain, R.A.

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Hand Grenades.

From the Experiences of the Russo-Japanese War.

Translated from an article by A. Bortnovski, in the "Voyennui Sbornik" of January, 1910.

In the late Russo-Japanese war there was one weapon which made its reappearance after many years' oblivion though still kept in our arsenals without any use being found for it; this was the hand grenade.

On account of the unique nature of the Manchurian war compared with former wars the hand grenade played a very important part in this campaign; and, again, on many occasions in the field, but particularly in the defence of Port Arthur, its influence had a very decided significance. Hand grenades were almost the only arms which could effectively reach the enemy in his round trenches from a short distance away, and drive him from his strong case-mated positions; finally the hand grenade was the superior weapon in every hand-to-hand fight.

It may be that the hand grenade appeared at an opportune moment, and that its introduction was called for by the peculiar circumstances of the Manchurian war, circumstances which may not occur again. But we have no right to assume that they will not do so. After a careful study of the Russo-Japanese war we arrive at the conclusion that with the improvement in firearms, that is to say, in bullets, quickfiring guns, and such like, the fighting troops involuntarily take to a rapid rate of fire and a defensive mode of action. The Japanese infantry—some of the finest of present times—carried bags which they filled with earth as opportunities occurred to protect themselves from the enemy's fire; in some cases the skirmishers even entrenched themselves and as it were fortified the firing line.

We shall probably never see again such important battles as Leyden, Rossbach, etc., lasting only several hours, or as Mars-la-Tour, St. Privat, Sedan, lasting for a whole day. Field fortifications are beginning to play a very important part. An enemy on occupying a position to make a fresh stand now fortifies this position with all means known in the science of field engineering. If it was formerly considered that an assaulting force that succeeds in silencing with its fire that of its opponents, must expect further serious opposition at the final assault, there is no doubt that now there is a very strong conviction on the subject.

Thus the attackers, to effectively dislodge their opponents, must proceed to a fight at close quarters, and here hand grenades—the finest weapons for a hand-to-hand fight—must be called into use.

And, as in fortress warfare, so in field fighting, the hand grenade becomes as it were the essential weapon, and it is probable that every country will revert to it.

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The employment of hand grenades in former times:—

We find that the first mention of the use of hand grenades in military history is in the year 1427. At the siege of the fortress of Casalmaggiore on the river Po, the defenders threw bottles filled with gunpowder—a primitive form of the modern hand grenade. From the 17th century the hand grenade came into greater use. They were cast iron or wrought iron balls hollow inside with walls about 0·3 inch thick and weighing about 2 lb., and were filled with powder. To ignite them they used a fuze, one end inserted into the powder and the other free for the application of a light. They were thrown about 40—50 paces, and to throw them long distances they used simple little machines or slings.

Grenades of similar construction, only differing in certain small modifications, were pretty frequently used in almost all armies.

In the 17th century the hand grenade was used a great deal. Thus in 1683 at the siege of Vienna by the Turks under Kara Mustapha 41,700 cannon balls were discharged by the defenders of the town, 6,650 bombs, and as many as 805,000 hand grenades.

After the 18th century the hand grenades were used less and less, although they continued in existence as late as the end of the 19th century.

In the year 1702 at the time of the famous Northern War, the dragoons of Charles XII were armed with hand grenades.

The Spanish used hand grenades at the siege by the French of Saragossa in the years 1808-09.

In the years 1855-1856, the French before Sebastopol used as many as 3,200 hand grenades. The Russians in the defence also used them, made of cast iron or thick glass. Rent into many sharp splinters these grenades in a continuous stream inflicted terrible damage on the attackers, and, producing when they burst a peculiar ringing noise, they also had a considerable moral effect.

In the years 1884-85, the English in their wars in the Sudan, made use of hand grenades. They were made of well baked clay or stone, in several pieces and weighed 1 lb. They were filled with Pyroxil, and in addition each had three magnesium stars for use at night. For their ignition they used fuzes which burnt for six seconds.

In the 17th century special soldiers were detailed to throw these grenades receiving the name grenadiers from the word grenade. They were chosen from strong, fearless, and brave men, and were considered to be the finest troops.

Grenadiers were introduced into almost every army. In the year 1667 Louis XIV. added four grenadiers to every company. Besides, they began to be formed into special companies, and were attached to infantry regiments. Afterwards they even began to form entire battalions of them.

When the need for hand grenades began to grow less, the name continued to exist and was intended to convey the idea of strong, brave, and fearless men. The grenadier branch of the army, made up of the best soldiers, was called upon to perform the most difficult and responsible tasks and to produce a strong and conclusive blow

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upon the enemy. The great Prussian Elector had for his bodyguard six battalions of grenadiers. Frederick the Great's grenadiers formed the flower of his army. Napoleon formed not only battalions of grenadiers but regiments and brigades, and in course of time a complete Corps of Grenadiers was formed.

The name grenadier is preserved up to the present time. In Russia there is a corps of them consisting of four divisions, and the use of the grenadier, as a fighting unit, is still as instructive and interesting as that of any other branch of the army.

If the last war showed the necessity for the use of hand grenades it also showed the necessity for the revival of the grenadiers, not indeed in the same form in which they formerly existed, but in some other suitable to the tactics and weapons of the present day.

The various forms of hand grenades in the late war:—

Hand grenades were first employed at the siege of Port Arthur, in August. At this time they were in great demand, and afterwards in all fights at close quarters they even became the chief weapons.

At Port Arthur the Russian hand grenade consisted of an old cannon ball or mountain artillery shell, and later, of rolled brass cases of quickfiring artillery, cut into lengths of four inches. They were filled with dynamite or powdered pyroxil and were usually provided with a fuze to burn for 15 seconds. The Japanese hand grenades in the early part of the war were made either of ordinary tin preserve boxes or of bamboo canes filled with 1 lb. of pyroxil. To ignite the charge a Bickford's fuze was used. The effect of the Japanese grenade was feebler than that of the Russian. In the early stages of the war it frequently happened that the fuze burnt too long, and sometimes the Russian grenades which had fallen amongst the Japanese were picked up by them and thrown back again into the Russian lines; and the same thing happened with the Japanese grenades. But this defect was soon put right.

At first the fuzes were lit from a match or an ordinary wick. Later, however, and particularly by the Russians, a touch hole of particular shape was introduced. Near the end of the Bickford fuze was fastened a rifle cartridge, filled with black powder. The cartridge was soldered to the outer shell of the grenade. Into this cartridge was inserted the end of a goose's quill filled with friction tube composition, a thin steel wire passing through the latter. When the wire was withdrawn the priming in the vent was ignited by the friction, and fire penetrated to the powder.

Inasmuch as the hand grenades proved to be the superior weapon, naturally both countries tried to enlarge the field of its use. It came to this that at first the Russians, and then the Japanese, began to construct wooden mortars, from which they could hurl the bombs to a distance of 100 sajenes (700 feet). The mortars were made of two semicylindrical pieces of wood 1½ inch thick joined together by strong hoops of bamboo. A pipe was thus obtained approximately 2 feet 2 inches long and with an interior diameter of about 5 inches. This pipe was placed on a wooden support at a permanent angle of inclination of 45 degrees to the normal. Ranges

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varying from 25 to 100 sajenes (175 to 700 feet) were obtained by different charges of black powder.

The Japanese made very powerful hand grenades, putting a prism of picric acid between two of pyroxil. The prisms were enclosed in paper and tied longitudinally with thread. Each grenade weighed about 1 lb. Into one of the prisms of pyroxil was inserted a Bickford's fuze 10—15 cm. long with a primer of fulminate of mercury. The men carried these grenades in pouches, hung by ropes round their necks. The fuze was ignited with the aid of a wick, which the Japanese carried wound round their bodies and lit before the commencement of an attack.

The Russians frequently used hand grenades of the following construction, cartridge cases of the 3 in. Q.F., were cut into four inch lengths; the bush for the cap was closed with a screw, and this cylinder filled with 600 to 140 grains of an explosive called "Sampson" (Potassium Chlorate, Nitro-Glycerine, etc.), or another called "Rackaruk" (they could not find the composition of this in Port Arthur), and also "Devine's" explosive (Potassium chlorate, mineral oil, nitro-benzine, turpentine, and picric acid). The charge was protected from damp by a coating of rezin and ignited by means of the Bickford fuze, which was connected to the primer by fulminate of mercury.

The Russians also made use of Japanese shrapnel cases which had not exploded. In the middle of one of these cases they put two cavalry charges of pyroxil (powdered) held in their places by a wooden stopper. In the stopper was an opening for a Bickford's fuze and a cap of fulminate of mercury. Taking the rate of burning of a Bickford's fuze as ¾ inch per second and considering the distance it is possible to throw the grenade, the length of the fuze was calculated out as between 4 and 5 inches. This Bickford fuze was prepared for ignition by cutting the end at a slant. Near the end they attached a match with its head primed, and to prevent this from catching fire each end was covered with a piece of wadding. There was no possibility of it not burning.

At Port Arthur hand grenades were made in three factories, which were capable of turning out about 1,000 daily, working the usual hours, and about 2,500 working day and night, and by the 1st August, about 18,000 had been made. The soldiers placed great trust in them. In fights at close quarters they frequently threw away their rifles so as to have a free hand for throwing the grenades.

General Kondratenko, was a great believer in this weapon.

The field armies, indeed, made very considerable use of them. Those used by the Japanese before Mukden were made up as follows:

A metal cylinder about eight inches deep and two inches diameter was filled to a depth of about four inches with Shimose. On the outside of the cylinder was a lead ring three centimetres broad and 1½ thick. At the lower end of the cylinder was fixed a wooden rod 50 cms. long and to the upper edge were soldered three small handles to support a tube filled with friction tube composition; the latter leading to the charge. On the cylinder was fixed a cover in the

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form of a cap with a needle soldered to its centre and fitting into the vent.

When the grenades were thrown into the air, the lead ring compelled it to fall to earth perpendicularly. Upon contact with the obstruction the lid was squashed in and the needle forced into the friction tube composition.

After the battle of Mukden, they began to make the cylinders with thick walls, and the lead bands were dispensed with. In order to ensure the vertical fall of the grenade in this case, to the end of a wooden shaft a tape, about 2 feet long and one inch broad, was fixed. The tape was wound on an iron rod, and fastened to the free end. When the grenade was thrown the tape unwound itself, thus guiding the grenade in its flight. The weight of the grenade was about 1—2 ℔.

Many of the Russian hand grenades were also adapted for percussion ignition and resembled the Japanese in construction. At one end the grenade had a wooden stick, and on the outside a lead coating to give it weight. On the upper end was formed a cap, with a nail soldered on as a needle. The soldier carried the grenade in one pouch and in the other, the cap.

When he required to use the grenade, the soldier fixed the cap on to it and threw it by means of the stick.

After the battle of Mukden, the grenades described above were somewhat altered.

In place of the lead coating outside the cylinder it was strengthened by two lead rings with grooves. Inside the cylinder was a fuze with a vent, and to prevent this from coming out, towards the top end of the grenade were soldered two "feathers," covering the opening in the fuze. On the lid of the grenade, at two opposite sides, cuts were made in the shape of the letter T,—and across a small disc—longitudinal cuts. The lid was put on the cylinder, held in the cuts by two tongues. The grenade could be set at full cock, and at "safety." In the first state, the tongue coming up against the disc broke it, and the needle, soldered in the centre of the lid, struck the vent. The weight of this grenade was about 1½ ℔.

Of all the grenades brought into use during the late war, the percussion ones proved the best, especially those which had a safety arrangement. The grenades with friction tubes were not handy enough; the matches used to ignite the fuzes often rotted, and the wicks, used for the same purpose, in damp or wet weather always refused to work. In consequence of this the Bickford fuze had to be used cautiously in conjunction with them. The percussion grenades were thrown by their handles, and here skill in throwing consisted in getting the grenade to fall vertically. They could be thrown distances up to 50—60 paces. If the grenade had a lead coating, after the throw the man had to hide under cover, as otherwise the splinters might fall back on to him.

The effect of the hand grenade:—

There were two effects from the hand grenade, that from the explosion, and that from its splinters. The large ones weighing 3—

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4 lb. with thick walls caused considerable wounds, both with its splinters and the explosion. Such grenades were only used at the siege of Port Arthur; and the sphere of effect was as large as 60 paces. The small hand grenades weighing 1—2 lb. which were used a great deal in the field caused a considerable moral effect: men received serious wounds if near the explosion, those in the immediate neighbourhood were killed by the concussion, or by the splinters of the cases which were like so many sharp and minute needles in their bodies; and finally, wounds were occasionally received from splinters of the lead bands or casing. The radius of effect of the small grenade was about 20—30 paces.

The correspondent of the *Daily Mail*, a Captain Norrigard, of the British service, who was with the Japanese forces before Port Arthur, on the effect of the hand grenade of large calibre tells us the following, relating his own personal observations after the occupation of 203 Metre Hill on 23rd November, 1904.

"The effect of this diabolical machine was stupendous, the bravest men must have felt terror and shuddered. In one wire entanglement 15—20 men lay in a heap, one dynamite bomb had fallen among them and killed the lot. They lay in such a confused mass that it was impossible to recognize to what body the various limbs belonged. By the force of the explosion their clothes had been torn from them, but were not scorched as one would have expected; only the shoes, boots and stockings remained intact. In one instance I saw only a belt round the naked body of a soldier, and not a thread more on it. All these corpses were mutilated in a terrible manner."

"A little way from the wire entanglements lay killed, not in dozens, but hundreds, frequently in heaps of 10 to 15 men, so that it was possible to see the effect of an individual grenade, which, exploding among them, had blown them to atoms. It gave one the idea of a salmi of human limbs in a sauce of brains, blood, and entrails. Those killed if not completely mutilated, wore expressions of terror. All the faces were so terrible as to make them quite unrecognizable.

"The effect of the explosion of the hand grenade was very local. Some were killed whose heads and shoulders were torn away, whilst the remaining parts of the body were absolutely untouched. Some men had their heads cut off, as if by a sharp sabre, or one part was completely mutilated, while the rest of the body was untouched.

"Such was the effect of the explosive shell, which were unceasingly showering fine splinters, like knives whistling in the air, with terrible force and inflicting death."

On the evidence of Osten Saken, and confirmed by many who took part in the recent war, the effect of the high explosive grenade in a trench occupied by its defenders, was so great that to the attacking troops the attack was considerably facilitated, but, on the other hand, those attacking with fixed bayonets might also be knocked down. Whichever side recovered from its stunning and terror after the explosion, it eventually came to this, that either the attackers succeeded in forcing their way into the hostile position, or the defenders, if they had time to recover, repulsed the enemy's attack.

If it is important to make use of the moral effect, then the small

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grenade weighing 1 to 2 lb., with thin walls will be quite suitable, and it is possible to supply field troops with these, as they are not particularly heavy. But if it is necessary to produce an actual effect, the heavy bombs weighing 3 to 4 lb. and having thick walls are more suitable, and they are better in fortress warfare.

The use of the hand grenade in the late war:—

During the siege of Port Arthur, the Japanese frequently used hand grenades in the attack of a work to pave the way for an assault with fixed bayonets, particularly if the enemy were ensconced under splinterproof or behind a strong breastwork or embankment. The 7th regiment acted in this way on the 9th August, at the attack on Fort East Pan-lung. On the previous day all the attacks of this regiment had been repulsed, and they had only been able to find cover for a small force in a trench which the Russians had recently abandoned. Here the detachment spent the whole night. The next day the officers decided to attack the fort, since, otherwise everyone would be slaughtered, as it was impossible to withdraw, and it was very difficult to get any help. Some sappers who happened to be amongst the number, had on them a few grenades. These they threw in front of them and, quickly climbing on to the crest of the breastwork from there began to throw grenades. Several splinterproofs were destroyed and a machine gun blown up.

Most of the Japanese employed hand grenades in fights at close quarters. At an assault the soldiers always carried several of them. Advancing to the assault, they held their rifles in their left hands, and with their right threw grenades. In this manner they paved a way with their fire for an immediate attack with fixed bayonets with the object of finally demoralising the enemy. This method was particularly characteristic of the attack by the Japanese of the 108 Metre Hill.

This hill had a double line of trenches, laid out one above the other, and was armed with two heavy guns and several machine guns. On 7th September, the Japanese succeeded in occupying the lower line of trenches, but the attempt to attack the top line the same day was a complete failure; so they put off the attack for the next. On the evening of the 8th after heavy artillery preparations, the first regiment advanced to the attack of the upper line. As soon as the Japanese companies reached this place—from where they could charge with their bayonets—the men held their rifles in their left hands and with their right threw grenades as they advanced. The Russians were so demoralised by this unexpected fire, that they offered scarcely any resistance, and, after a short fight the hill was occupied.

Even during a hand to hand fight both sides employed hand grenades. At the third assault of 203 Metre Hill on 22nd November, 1904, in the hand to hand melée men threw away their arms, relying entirely on the grenades. According to the words of Norrigard, who witnessed it all "here there was as it were an apotheosis of pyroxil, dynamite, and melinite."

Grenades proved their great utility to the Japanese in the strug-

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gle for the possession of the casemates after the glacis had been scaled. Such struggles were enacted at the occupation of the North Chi-kuan Fort on 18th October. Galleries in the counterscarp were divided by walls with passages without doors. The Russians blocked up the passages with sandbags. The Japanese during a week were compelled to fight for the possession of these casemates, and the chief weapon they used was the hand grenade.

At Port Arthur they were most useful in the defence of those outer trenches which had no flank protection. Our troops made this use of them; for example, at the attack by the Japanese of Fort Shui-shih-ying on 6th September, 1904, a few of the enemy, in spite of heavy losses, succeeded in reaching the outer trench, where the fire of the Russians could not reach them. Then the defenders of the fort began to throw grenades into the trenches, and blew to pieces most of the Japanese.

Again at the final assault on the fort the Russians met the enemy chiefly with hand grenades.

On 10th November, the Japanese decided to occupy the trench known as the "Trench of Death," which connected the Forts of Chi-kuan and Kobu. This trench was strongly fortified. The Japanese brought their final parallel up to within 50 paces of the trench. They could not get any further by sapping as the ground was hard rock, and the Russians rained grenades on to the working parties from small mortars. The Japanese determined to make the assault. As soon as the enemy charged with the bayonet the Russians met them with a hail of lead and hand grenades. And, although the enemy took possession of the trench, he was very shortly driven out again, when the Russians used their rifles as well as the hand grenades.

Our troops at Port Arthur employed this new weapon on many occasions; thus patrols sent out for reconnaissance work, carried a couple. Norrigard speaks in the following terms of these patrols:—

"Small Russian patrols quietly stole about to the front by night with a rifle in one hand, and a couple of hand grenades in the other. Quietly and cautiously they crawled forward towards that spot whence they could hear the dull sound of the spades on the hard earth. The Japanese sentry posts saw certain shadows. They fired a shot. Men threw away their picks and spades and seized their arms. There is a terrible explosion,—and then another. A complete silence follows and the night seems darker than it was before. In the sap lie half a dozen corpses, horribly mutilated, which are covered with earth and later taken away."

In the winter position on the Sha-Ho, the sentries were provided with hand grenades, which they used to repulse small parties of the enemy. The Japanese when in bivouac practised throwing them.

At the attack of the Russian forts round Mukden the Japanese also employed hand grenades. Each company having 4 to 10 brave grenadiers. When they came up to the obstacle, the grenadiers threw their grenades into the fort. Under cover of this the sappers destroyed the obstacle. The Russians substantially helped them in the work because they always placed the obstacle near the trenches.

The Japanese cavalry also carried hand grenades. When pressed by Russian cavalry the Japanese horsemen threw grenades under

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their horses. If the rider was not killed, and the horse disabled, the latter was so terrified that the enemy had time to get away and avoid pursuit.

Deductions drawn from the use of the hand grenade:—

Merely from this small article on the use of hand grenades it is possible to make some deductions on the use of this weapon.

(1). In the attack, to drive the enemy out of his trenches, though they bristle with a whole row of bayonets, a grenade thrown into it produces a material and especially a moral effect sufficient to pave the way for the attack with fixed bayonets, as the Japanese did at the attack on Fort East Pan-lung on 8th August.

(2). Before the bayonet attack, when they have to cross the 100 or 50 paces separating the firing line from the enemy ensconced in a fortified position. Throwing forward a grenade and completely demoralising the enemy the assaulters can better prepare for the final bayonet charge and create as it were a wall of fire between them and the enemy.

The Japanese at the attack of 180 Metre Hill on 8th September, by throwing forward grenades into the midst of the Russians, made their occupation of this strong position considerably easier. The defenders of Port Arthur did this in all their counter attacks.

(3). When the opponents met in hand to hand encounters, hand grenades proved of the utmost value. Skilfully thrown in to the ranks of the enemy they caused tremendous havoc. In almost every bayonet fight round Port Arthur, the Russians and Japanese preferred to use hand grenades rather than their rifles.

(4). They were particularly useful in the demolition of obstacles. As we have seen already every Japanese company had from 4 to 10 grenadiers, who, lying down behind wire entanglements, threw their grenades into the midst of the enemy. And, under cover of this, the sappers destroyed the obstacle.

(5). Finally, the attacking force could make use of the hand grenade to drive out the enemy, standing a short distance from the fortified work.

They could not bring up the artillery, and it was difficult to destroy the work; fortunately a grenade thrown into it could destroy all its defenders. The Japanese had recourse to hand grenades, when they had to drive Russians out of fortified casemates.

(6). Grenades were particularly adapted to the defence of a fortified position. When the assaulting enemy advanced in line after line the defenders could only resist him for any considerable time by using hand grenades, which caused much damage in the enemy's ranks.

The defenders of Port Arthur always used the hand grenades to repulse the enemy's assaults on the fortress.

(7). With hand grenades the defenders could hinder the enemy in the construction of his parallels and the digging of saps towards their fortifications. Behind shields constructed with sandbags and breastworks, the enemy's workmen were almost invulnerable to a

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rifle bullet, and the artillery shell could not be used against them as they were so close.

Fortunately hand grenades thrown could blow to pieces the workers in the trenches. The Russians resorted to these means to hinder the Japanese in the digging of their near parallels at the siege of Port Arthur.

(8). When the line of outposts is in close touch with the enemy, it is an excellent plan to supply the sentries with hand grenades to drive off any small parties of the hostile scouts. And this is also very useful for patrols and detachments of scouts sent out to spy on the enemy. In the late war under all such circumstances hand grenades were very largely used.

(9). Finally it would not be superfluous if the cavalry were also given them. Of course they would not use them in the attack but in the defence when the hostile cavalry can not otherwise be driven away. The Japanese cavalry very often employed them when pursued by Russian cavalry. There were only very few cases of any Japanese cavalry being taken prisoners.

Since fortresses, as we have already remarked, will play a very important part in all modern wars, the duties of troops in the attack and the defence of these must be clearly understood beforehand. We have seen that hand grenades are essentially necessary in a fight round a fortified position as the only possible weapon for fights at close quarters. Besides they are useful in other phases of a war, as in the work of sentries and scouts.

We therefore must in times of peace pay special attention to their scientific employment, making it one of the chief subjects for instruction.

H. D. Ashby, 2nd Lieut., R.G.A.

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Artillery Manœuvre in Co-operation with the other Arms.

Translated from "Rivista di Artiglieria," December, 1909.

An examination of the reasons why artillery, when manœuvring with other arms, often commits faults which make its fire action unreal, is opportune in bringing to light what steps should be taken to eliminate, or at least decrease, the most important mistakes.

The excuse for this examination is that it is necessary to clear up whether the artillery is entirely to blame for these errors in employment or whether on the contrary it is the victim of expedients forced upon it at manœuvres.

The first charge made against the artillery is that of manœuvring in sight of the enemy when on the march and when coming into action.

This is a very serious mistake, especially with the armaments of the present day, because in the great crisis which artillery goes through in the period which precedes the finding of the range, it is passive and the natural target for the enemy's artillery on the look-out. It is thus denied the power of profiting from the means given by the material to develop its action under cover of the shelter offered by the ground. It is also neglecting the teaching given in its preliminary instruction which is invariably applied when it manœuvres alone and more particularly at practice camp.

If it acts in this way, the cause must be sought in the need—sometimes derived from an ill-advised order—of making its action felt by unmasking itself on the position. In the absence of live shell, this is the only remedy it possesses.

Signalling discs, with which it is attempted to show whether the artillery is firing on infantry or artillery, do not serve their purpose, because at long ranges it is difficult for the discs to be observed and clearly identified. Again they do not show on what section of the front the artillery is supposed to be firing. And then, since nowadays the battery is required to be under cover, the disc must be placed where the ranging officer is observing, and directing the fire, so that the position of the guns with regard to the discs would be most problematical.

Perhaps it would be a good thing to arrange a system of signalling with artificial light sufficiently powerful to throw a beam of light upon a target which might be over 5,000 yards distant. Better than all, the work of the umpires would be useful if the development of the successive actions, at least in the phases when the artillery plays a prominent part, were made in accordance with the tactical situation and if the infantry in particular were held in check until they knew the result so as to regulate their own action. In this there is nothing artificial, as the infantry would thus learn to exercise that patience which is so necessary in real warfare, and which should be its leading virtue. Naturally the number of umpires would have to be increased.

Another complaint brought against the artillery—at practice camps as well—is that of constantly changing target, and directing fire at anything coming within the zone of observation.

At practice camps, the blame for this rests partly on the Commandant who, in pointing out successive targets to the batteries, often forgets to tell the commander if the fire which he has brought, or is still bringing, to bear on the former target has or has not had the desired result. But the imperative economy of ammunition forces us to regard as effective a series when the range has scarcely been found, and then the battery thinks it is authorised to change target. Both causes have the effect of making battery commanders used to rapid changes of target. This truly constitutes an error from which the artillery must free itself.

In manœuvres with other troops, there are various reasons for similar mistakes in employment. Above all, the rapid succession of the various phases of the battle gives no time to the artillery to perform that effective preparation which is its rôle, and from the hurrying of solutions, it is led to a continual changing of target, contrary to the tactical considerations which govern its fire.

But worse is to follow. The objective, against which commanders of troops are going to use the greatest force, is rarely clearly indicated to the artillery. If it has been pointed out at the beginning of the action, no further information is sent as the situation changes. For this reason the artillery has to act on its own initiative, and as often as not flounders in the mire, engaging, one after another, those targets which present themselves and probably losing sight of the main issue.

As a remedy for this mistake, it is necessary that at manœuvres the communication between artillery and infantry should be very close, and that above all the action of the commander of the force should not stop short at giving a general idea of what is going to happen. He should make himself felt constantly during the action, and direct the fire of the artillery towards those objects on which he is moving, or which offer greater resistance to the action of the infantry.

A wrong appreciation of its correct tactical employment makes the artillery commit another fault, namely frequent change of position, often of only a few hundred yards, not necessary by any need

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of shortening, in the generality of cases, the range.

Change of position must be left to the initiative of the artillery when, as may happen, it thinks a change is necessary to a position from which it will gain better fire effect according to the state of the battle. It does this from its own observation, or if the commander of the detachment of troops to which it is detailed, informs it that the result of its fire, at a given moment, is not sufficient to allow him to prosecute his own action.

However, while it is a fact that the artillery is often tempted to show off its mobility, it must be allowed that, in the majority of cases, it is forced into these dangerous changes of position, which to-day expose it to danger, owing to the hurried advance of the infantry. The latter, as already stated, are loth to wait until the artillery has performed its allotted duty of preparation, whereas in real war the effect of the shells would show how necessary is such a pause. It would be a good thing for infantry to get accustomed to this in peace manœuvres.

But, in order that the artillery, on their side may eliminate this fault, which is a really serious one, they must, in their own manœuvres, have sound tactical instruction given by the directors. These should point out on the ground in detail the results of effect and of losses under which the fight would have been developed had the guns remained, or not, in a given position. They must always keep in view the situation of the enemy and above all that of the troops with which the artillery is co-operating.

J. G. Dooner, Capt. R.F.A.

Training for War.

Co-operation of Artillery and Infantry.

Translated from "Jahrbücher für die Deutsche Armée und Marine," January, 1910.

The amount of attention that is paid to this subject in France, where in addition to artillery officers being attached to infantry as in Germany, officers of both arms are mutually attached for considerable periods. The general principles of artillery should be printed in the Infantry Training Manual, as the knowledge of these is bound to be of great use to infantry officers.

Value of early reconnaissance. Why should not infantry also send mounted officers forward with the cavalry, as the artillery does. If they are to support each other in the fight, it would be a good thing for them to carry out the preliminary reconnaissance together. When the infantry officers go back, they can report on the positions selected for the artillery position, in addition to the ground over which they themselves will have to operate.

It is indispensable for a successful co-operation that the artillery should be incessantly kept informed of the movements of the infantry, and vice versa. From the infantry point of view, the artillery action should be as follows:—

1. When the infantry of both sides are still far apart. The artillery should strive to attain a superiority of fire over the hostile artillery.

2. As soon as the attacking infantry comes within the musketry fire of the defence, the artillery should turn as large a portion of their fire as possible on to the infantry of the defence.

3. When the point of assault has been decided, the artillery should concentrate an overpowering fire on that point.

4. While the infantry are working their way up to assaulting distance, the artillery must continually co-operate.

5. Single batteries accompany the attack up to close range.

6. During the assault the infantry expect the artillery to keep up their fire on the point of assault up to the moment that the infantry break in there.

7. When the infantry have captured the position a proportion of the batteries hurry forward to assist them in holding it.

The writer offers a few remarks on the foregoing. As regards para. (1):—

While the infantry are still far apart, it is the duty of both arms to keep themselves informed of each others movements, and of those of the enemy.

(2). Well trained infantry will not reply to the fire of the defence until they come within effective range. This is where the close co-operation of the two arms comes in. It will be difficult for the artillery to judge when their infantry comes within musketry fire. But as soon as they have ascertained this, they must at once turn their fire on to the hostile infantry.

3. The point of assault will generally become known after the infantry have entered into the fire fight.

(4). To effectively co-operate with the infantry, the artillery will probably have to leave their concealed positions, and come into partly concealed, or even open positions. As this advance of the infantry will be a very slow one, the artillery will not be able to keep up a constant fire, but will have to select favourable moments.

(5). The moral effect of the near pres-

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ence of batteries in the assault is a particularly strong one.

(6). Under favourable circumstances the batteries will cease firing when the infantry come within 300 metres of the enemy.

(7). Any batteries that have hurried forward will be in a particularly favourable position to repel a counter attack, or to cover a retreat if the assault fails.

The author then considers:—

The French tendency to take up advanced positions in the defence. The disadvantages of these, The attack on an enemy deployed for defence.

The attack on a fortified position. The pursuit. Why the artillery is specially adapted to this service.

The necessity of officers of both arms seeing the work of the officers of the other arm. How often has an infantry subaltern seen the working of the artillery. Would it not be of great use for an artillery subaltern to go through an infantry attack now and then, with the infantry.

When do artillery and infantry really practice together? As a rule artillery begin to shoot on the practice ground, just as the infantry are leaving it.

For many umpires the artillery is still a *Noli me tangere*, and the artillery generally prefer to have an umpire of their own arm. How can the infantryman learn artillery tactics, action and effect in this manner? Why should not operations be practised more piece meal than is done at present? Why is it always necessary to go right through from deployment to pursuit. The result of this is naturally that matters are hurried through, for the individual phases require much time. If this time is not allowed much harm is done, as it creates false impressions.

H. A. Koebel, Capt. R.F.A.

Kriegstechnische Zeitschrift.

Précis of Contents for January, February and March, 1910.

January, 1910.

1. Tactical and Technical Notes on Infantry Rangefinders. The tactical value of an infantry rangefinder depends on the improvement in fire effect resulting from its use. The writer bases his calculations on the results obtained with a one-man rangefinder with self contained base 32 inches long, and compares these with results obtained by judging distance. He demonstrates by the theory of probabilities that the use of the rangefinder will increase the number of hits obtained at all ranges, and will double the number of hits obtained at 800 yards and over.

2. Hand grenades. A description with illustrations of Martin Hale's hand grenade as used in the Manchurian war.

3. A Swiss experiment with signalling flags. These were used for communication between the B.C. and his battery, when the latter had ridden forward, and between the observation point and the B.C. Morse was not attempted, but an improvised code of nine signals with four coloured flags was used. This was found to answer well.

4. Gun carriages with compressed air running-up gear. Three new systems are described; one with four air cylinders, one with three, and one with two placed tandem. All appear very complicated, and the author considers them inferior to the German system of a simple spring-column.

5. Field Entrenchments. An extract from a Russian paper complaining of the want of intelligence shown by Russian officers in designing, constructing and using field entrenchments during the Manchurian war.

February, 1910.

1. The fortifications of Copenhagen.

2. Gun carriages with compressed air running-up gear (continued). The improved Rothe recoil gear. This gear was described in the "Translations" issued with the R.A. "Journal," No. 4, July, 1909. It has now been improved by substituting a compressed air reservoir for the springs, and making the buffer also fulfil the functions of a running-up cylinder. The author cosiders that pneumatic buffers can never be made reliable, on account of the difficulty of keeping the valves tight; the air gets hot and dries up the packing. A design of a 6" howitzer with combined rear trunnions and controlled recoil is given.

3. The use of the parabolic reflector for instantaneous photography by the electric light. The writer describes a method of illuminating a flying projectile so as to obtain a photograph of it.

4. Hand grenades (conclusion). The French melinite hand grenade.

5. The assault in Siege Warfare. This article deals with the preparation, organization, and execution of the assault, the implements required, and the method of overcoming obstacles.

March, 1910.

1. Electric Gear for running targets. A description of the gear used for work-

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ing running and surprise targets at the principal German ranges. At Lager-Lechfeld there are two splinter proofs on the range, each with 10 winding drums. Each drum is capable of pulling four target sleighs, each carrying 25 figures, for a distance of 3,300 yards. The drums are worked by electric motors supplied with current from storage batteries; the batteries are charged by a gas engine. At the great ranges of Elsenborn and Jüterbog, the ground is too extensive to admit of the use of central winding stations, and transportable winding stations are used which can be established at any desired point. Each of these stations consists of a 26 h-p. traction engine for transport and as a source of power, two wagons with storage batteries and two winding wagons each with three drums. Similar transportable stations are used at Döberitz and Zeithain.

2. The use of the parabolic reflector for electric instantaneous photography (continued). A description of the method of measuring the remaining velocity of a shell or a bullet by pnotography. The parabolic reflector is used to illuminate the shell or bullet as it passes a camera. The light is furnished by a succession of electric sparks discharged at known intervals of time; each spark gives a photograph which is recorded on a moving or revolving plate in the camera. The distance between successive photographs on the plate enables the remaining velocity to be determined.

3. The Assault in Fortress Warfare (continued). A complete set of very elaborate orders for the assault is given; these include orders by the Commander-in-Chief, Officer commanding section of the attack, Officer in command assaulting troops, and by their subordinates. The article describes the preparation and conduct of the assault and the steps to be taken after it has succeeded.

4. The New Swiss Infantry Rifle. Details and photographs of the new weapon are given. It is a magazine rifle with bolt action, weighing nearly 10 lb. The magazine holds 12 rounds and can be quickly re-filled with a charger.

The rifle fires the new pointed bullet with M.V. of 2,700 fs., giving a trajectory so flat that no elevation is required up to 550 yards. The accuracy is said to be remarkably good.

5. Field fortifications in France; a practical example. This is a review of a new book, "L'organisation du terrain sur le champ de bataille," by Capt. Bastien, describing a series of imaginery operations round Laon, in which entrenchments are freely used. The book gives maps, illustrations and full details of the works constructed. The German critic considers that Captain Bastien's work is a most valuable and instructive book.

6. The automatic infantry rifle. There is a strong body of military opinion in France in favour of the introduction of an automatic rifle. The French Minister for war has issued a circular laying down the conditions which such a rifle must fulfil.

These conditions were given on page 25, "Translations" for may, 1910.

H. A. Bethell, Bt. Colonel R.F.A.

Artillery in Defence.

Translated from the "Spectateur Militaire" of March 15, 1910.

Military schemes are generally framed for the study of the attack, hence the defence is often neglected, looked upon as an inferior sort of warfare, and relegated to less highly trained troops. It must be remembered that there is no such thing as a strictly defensive or offensive action; e.g. an advanced guard which has established a bridge-head beyond a river which the main body has to cross next day, has to fulfil both rôles.

In the artillery attack also, some batteries will be detailed to act on the defensive and watch for counter attacks. A flank guard, originally posted for defence, may also have to assume an offensive attitude.

In the defence artillery must endeavour to check the advance of hostile infantry when still beyond rifle range. The latter will take every advantage of cover, and only fleeting opportunities will present themselves, which will call for great decision and quickness on the part of the artillery commander. While "artillery" and "infantry" batteries must be detailed, a single battery may have to act in both capacities, and have several different objects to engage.

The artillery commander must not select his position until he has thoroughly studied and discussed it with the infantry commander. Infantry advanced posts, unless they co-operate with the artillery, run the risk of being destroyed or captured. They cannot be left long unaided, or they may become demoralised and subject to panic, after long hours of nervous tension. They may cause the attacking infantry to deploy and thus afford a good target to their artillery.

We must maintain the 1870 principle

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that artillery at the moment of attack must advance into the front line. The detachments, protected by shields, will be safe from rifle fire, but the teams will run risk of heavy loss. Emplacements must be constructed beforehand, defiladed from the enemy's batteries, and in many cases they must be occupied by night. Sometimes it will only be possible to employ a section or even one gun for this purpose.

Some officers are in favour of the whole of the artillery of the defence engaging the enemy's infantry, without firing on their artillery.

The French artillery in 1870 found it took too long to identify and range on the hostile guns. Some would like to see all the artillery act in the open, and this principle still obtains in the German army. In our opinion this system should be banished from the modern battlefield. The fire must not be entirely concentrated on the assaulting troops, and it will be more than ever necessary to engage the enemy's batteries which are supporting them.

Various questions will now present themselves, viz: How to recall the flank guards, whether a battery is to be split up, when and how the order to occupy the emplacements is to be communicated. These problems can only be solved by experience.

We have assumed that there is ample time to prepare the defence, and it seems that the more perfect arms become and the longer become the ranges, the rarer will be violent changes of fortune or regrettable incidents on the battlefield. In case of sudden disaster, reconnaissance must often be abridged or entirely abandoned, and the most dangerous object at once engaged.

The old Napoleonic system of attack, for the assaulting troops to deploy at 600, 800 and 1000 yards from the objective and march on it like one man will not succeed in modern warfare. It is impossible to prescribe any hard and fast method, the rising hostile tide must be checked at all costs, and batteries will have to act without awaiting orders.

In connection with the above, the following remarks may be made:—

1. Artillery must simultaneously engage the enemy's artillery and infantry.
2. Artillery must act in co-operation with infantry advanced posts.
3. Some artillery must be told off for targets at short ranges.
4. These must be concealed from the enemy's batteries.
5. The long range engagement must be maintained to the end by a portion of the artillery.
6. The artillery must have confidence in its ability to repel attacks in close order.

E. P. Smith, Major R.F.A.

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A method of firing against Artillery behind cover.

Translated from "Revue d'Artillerie," November, 1909.

Against an artillery concealed behind the crest of a hill, the Regulations order that fire should be directed on the crest, and when the range is found, volleys should be fired at ranges increasing by 100 métres, with time fuzes. But what damage will time shrapnel effect against a personnel sheltered behind shields? Some damage may be done, but the amount is very problematical.

These notes are written with a view to showing that it is possible to effect something more and with a considerable saving of ammunition.

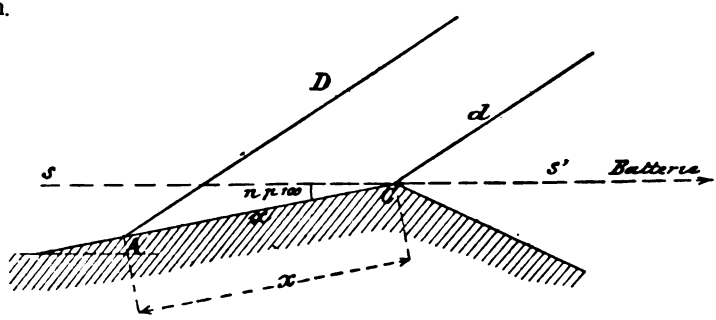

Fig. *a*

If C in fig. 1 is the crest of a hill behind which is the enemy's artillery at, say, A. What we want to find is the trajectory corresponding to the distance D. This can be calculated mathematically by considering the distance x and the angle n, and thus a table can be constructed showing the value of n for all values of x.

TABLE No. 1.

	n = (p. 100).									
	1	2	3	4	5	6	7	8	9	10
1000	200	∞	—	—	—	—	—	—	—	—
1500	150	300	∞	—	—	—	—	—	—	—
2000	120	150	200	300	600	∞	—	—	—	—
2500	115	126	166	215	300	500	1500	∞	—	—
3000	110	120	133	150	170	200	240	300	400	600
3500	107	116	127	140	155	175	200	233	280	350

The use of this table is as follows:—

Take for example a round fired at 2600 m. elevation behind a crest distant 2500 m., we see by the table that it falls 300 m. behind the crest where the slope is 5 in 100 m.

If the slope was greater than 7 in 100 the shell would fall at a considerable distance over 1500 m.

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Again, we know that a percussion shell gives an area of explosion the height of which averages 3·5 to 4 métres at the moment of explosion. This height can be compared with the diameter of the flash.

Consequently the flash and the explosion being seen at the same moment and at the same spot are seen in a similar manner.

Hence with two elevations, the first being the distance to the crest and the other behind the crest, one can calculate both the slope and the distance at which the shell struck behind the crest.

In order to find these particulars we shall have to fire percussion shell behind the crest at successive distances of 25, 50, 100 m., &c., and then observe the last shot of which we can see the explosion.

A table can then be constructed giving the slopes (Table No. 2) and distances of the enemy's battery for different values of *d* (fig. a).

TABLE No. 2.

	d =							
	1000	1500	2000	2500	3000	3500	4000	4500
25	1·8	3	4·4	5·6	6·9	8	9	10
50	1·6	2·5	3·4	4·1	4·5	5·3	5·7	6
100	1·3	2	2·4	2·7	3	3·2	3·3	3·4

TABLE No. 3.

	d =							
	1000	1500	2000	2500	3000	3500	4000	4500
25	200	133	90	71	58	50	44	40
50	250	160	115	100	90	75	70	66
100	307	200	166	148	130	125	121	116

These two tables can be thus explained.

If there be a crest say at 3000 m., and the last percussion shell which can be seen was fired at 3050 m., it follows from Table 2 that the projectile fell on a slope of 4·5 in 100, and it touched the ground not at 50 m., but at 90 m. behind the crest (table 3).

First example:—

An enemy's battery, 50 m. behind the crest on a slope of 8 in a 100, although the flash of discharge can be seen, cannot be touched by a shell fired with elevation for 3050 m. if 3000 m. is the range of the crest, since the projectile will fall 150 m. behind the crest.

The shell fired at a range of 3050 m. will fall 25 m. behind the enemy's battery.

The burst of this shell will not be seen because it will fall 75 m. behind the crest (table 2), and in order to be able to see the top of the circle of explosion the shell would have to burst not more than 50 m. behind the crest (table 3).

We must not, however, conclude that the slope is so steep that the enemy could not bring his guns into action on it.

This example shows the great importance of taking up positions immediately behind the crest of a hill.

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Second example:—

If we imagine an artillery seen by the flash of discharge to be behind the crest of a hill which is distant 2500 m., we should fire at successive ranges of 2600 m., 2550 m., and 2525 m.; and let us suppose that the burst of this last is seen. By referring to table 2, we find that this corresponds to a slope of 5·6 in 100, and by referring to table 3, we find that at 2525 m. the shell struck at 71 m. behind the crest. Suppose that at 2525 m. the burst was not seen, the slope is then more than 5·5 in 100. Let us say a slope of 6 in 100. If the slope is 6 in 100,the bursts not seen fall at 500 m., 250 m., 125 m., behind the crest, and their trajectories thus graze the slope.

The enemy's guns are then presumably between two points distant 2530 and 2560. The first range corresponding to that at which a man on foot would be unseen, the second to that at which the flash of discharge would not be seen.

But we know that the enemy's battery cannot be on the crest which is 2500 m. range, and it is not at 2525 m., so that we set the elevation at the mean, say, 2512·5 m., when our shell will fall at 60 m. behind the crest, which will be near the enemy's battery (fig. *e*).

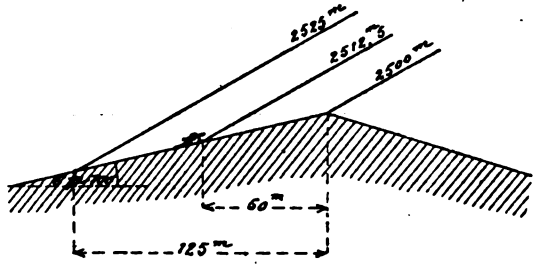

Fig. *e*

In the preceding examples we have only taken into consideration the mean point of impact corresponding to each trajectory.

The probable rectangle given in the fire tables gives us all necessary information.

If *e* be the length of the probable rectangle corresponding to an elevation *d* we know that 50% of the shell fired with this elevation (*d*) will fall in a zone whose length is *2e*. Our object then is to obtain the elevation of this beaten zone *e*.

In the case of a slope this zone becomes E (fig. *g*), and $\frac{e}{E} = \frac{CD}{CD'}$, this ratio $\frac{CD}{CD'}$ is given in table No. 1.

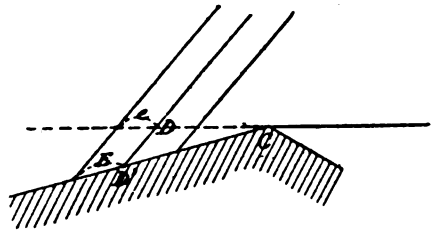

Fig. *g*

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Let us consider what occurs in example No. 2 (above). 50% of the shell fired at an elevation of 2500 are spread over a zone 19 m., 40 from the crest. That half of them which falls in front of the crest is lost. The other half is spread over the slope $b\,c = 48{\cdot}5$ m. Beyond that on a length of $3 \times 48{\cdot}5 = 145{\cdot}5$ m., 25% of the shell fall (fig. *h*).

At 2525 m. the mean point of impact of the shell is at A 125 m. behind the crest, 50% of them falling in *aa'*.

The battery is at B, 66 m. behind the crest. And it will be struck by some of the shell fired at 2500 and 2525 m., whose mean point of impact is between *e* and *2e*. Say 16% of the projectiles fired with these two elevations, over a zone of about 30 m.

To sum up, the battery is enclosed between two well beaten zones, but as a matter of fact only a few short shell and a few long ones can touch it. And it must not be forgotten that bursting shell act principally in a lateral direction. A shell bursting at *b* is at 18 m. from the battery, and its effect will only be slight.

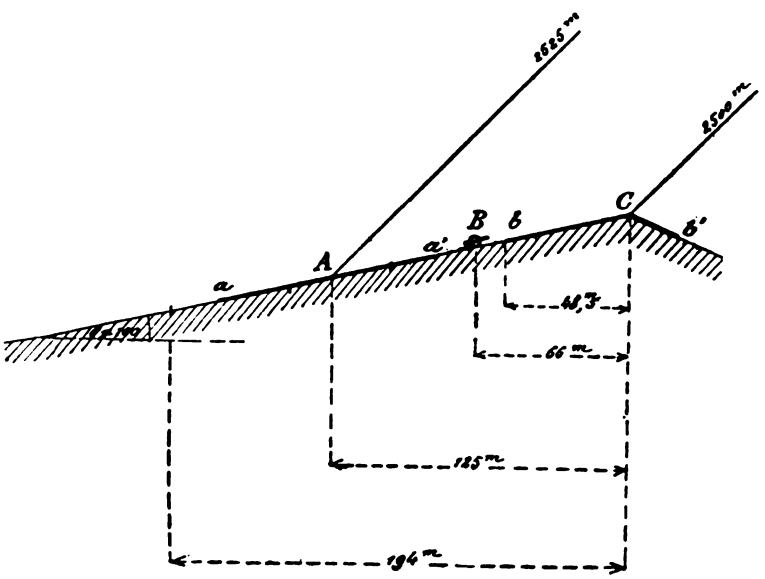

Fig. *h*

To complete the fire, let us use an elevation of 2512·5 m. The most efficient zone of dispersion at this range will just enclose *a'b*, which before was not well covered by fire, and hence the efficiency of fire against the enemy's battery will be very considerably increased.

The zone of attack being determined, it can best be beaten by making jumps both ways in the range of 12·5 m.

All these calculations, drawings, &c., which have been introduced in this article are merely with the object of showing mathematically how a target, sheltered behind a hill, may be discovered by a practical method.

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But since at the practice camp and on the battlefield everything must be simplified and made easy, and calculations are not possible, some method must be discovered for firing at hidden targets, in the same way that there is a method for bracketing a visible target.

Let us consider an even regular slope giving to the shell a regular burst of a medium height of a little under 4 m. First range on the crest, then search the ground in rear with percussion shell. Let D in fractions of 25 be the last elevation giving visible explosions D + 25 is then invisible.

If the enemy's battery is only just seen by the flashes from the guns, that is to say, it is defiladed by 4 m., D is the limit of the short bracket, D + 25 the long one. Then the length of effective elevations will be

$$D,\ D + 12{\cdot}50,\ D + 25.$$

But it is absolutely necessary to verify D by several shell. If there is any doubt at all reduce the elevation by 12·5 m. and verify. This verified elevation we will call D.

Comparing what he sees of the bursts of his own shell and the appearance of the flashes of the enemy's guns, the battery commander will decide on the elevation D with reference to the exact range of the enemy's battery.

For example, if the top of the flash is only just seen, the distance D will be the short limit of the required zone.

The zone will then best be beaten by elevations D, D + 12·5, D + 25, and the battery is bound to be hit.

If only half the flashes are seen the best elevations will be

$$D - 12{\cdot}5,\ D,\ D + 12{\cdot}5.$$

If the flashes are not seen at all, merely the smoke, the required zone will be greater. We know that a mask of 8 m. corresponds approximately to the case where smoke only is seen.

If, therefore, D – k25m. is the height of the crest, D + k25m. will be the short bracket of the elevation, and we commence with this elevation and fire with several others.

In order to make sure, it would be better to commence at D, but the size of the zone must not be forgotten.

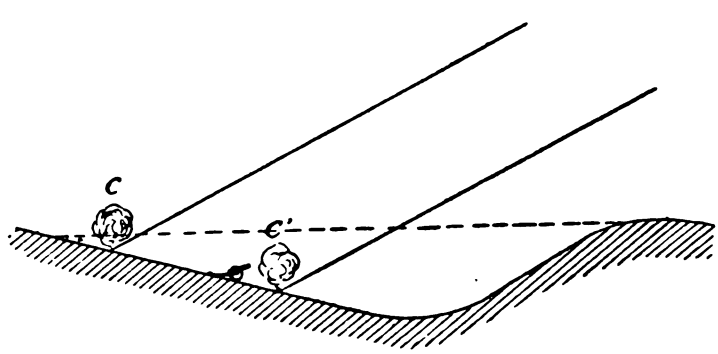

Fig. j.

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Discovering the position of a battery on a concealed counterslope such as fig. *j* is done in an exactly similar manner, with this difference, that a completely visible burst C is the longest limit, the first unseen burst in going from long to short elevations is the short limit of range.

Increments of 12·5 m. are still necessary by reason of the law of dispersion, so that the firing should be more effective, but they are not so necessary as in the case of a battery behind a crest.

It has now been practically proved that by the method herein described, by using percussion shell, a battery with shields hidden by the crest of a hill can be dealt with effectively, and with a relatively small expenditure of ammunition.

A. H. C. Phillpotts, Colonel, late R.A.

Ammunition Supply Notes.

Translated from "Revue d'Artillerie," March, 1910.

The following is the present organisation:—

The Park of the ammunition supply of the Army Corps is divided into three échelons which, as regards artillery ammunition, are almost similar.

The two first échelons are composed of interchangeable units which are sections of artillery and infantry ammunition and are intended to supply the troops on the actual field of battle.

The third échelon contains the units which are not available outside the network of roads, sections of the artillery park, and sections for the repair of materiel.

In the ammunition sections, the ammunition is carried in artillery ammunition wagons.

In the artillery park sections, the artillery ammunition is in plain deal boxes, which are loaded on the transport wagons belonging to the park.

As soon as a fight is imminent, the 1st échelon is sent on to a point called the *point of bifurcation* at least five kilométres (about three miles) from the firing line.

From this point, full ammunition wagons are sent out to places on the field where they are required, and a continuous supply of ammunition is kept up.

All the units being under the command of the Director of the Park facilitates these duties.

But in the case of units arriving at this *bifurcation point* for ammunition it is a different matter. In this case centralisation becomes inconvenient.

The fact that instructions and orders only reach the commander

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of the 1st échelon through the artillery commander, who is usually on the fringe of the battlefield, is sure to produce complications and very awkward delay.

Besides this, where there is only one *bifurcation point* for the whole Army Corps, it means that the system overlooks the great extension there is always now-a-days in the field of battle.

Scheme for the Reorganisation of the system of Ammunition Supply.

The proposed reorganisation may be thus summarised.

The Army Corps artillery park contains all the units of ammunition supply. It is divided into a certain number of groups having a variable composition, containing, however, at least three units.

As soon as an engagement is contemplated, the Director of the Park attaches a mixed group of ammunition sections to each division of the Army Corps.

From this moment it is the duty of the group commander of the first supply group to put himself into communication with the commander of the divisional artillery, and he thenceforward belongs to his command.

It is then his duty:—

1. To fix the base for the supply group.

2. To establish communicating files with divisional artillery brigades and regiments of infantry.

3. To make sure of ammunition being replenished in the line of battle by the units under his command and by those sent up from the rear.

4. He has to see that the empty wagons are sent back to the Director of the Park.

5. To keep the Park Director constantly informed of the amount of ammunition supplied to the troops, and to send him an estimate of probable further requirements.

The Director of the Park is specially responsible that there is a continuous supply of ammunition to the group bases of the first échelon supply.

Since he knows the base of the advanced portions of the Grand Army Park, and of the groups of the first échelon, it is his duty to regulate supply from the supply units in rear, so as to satisfy any possible demand that may be made by the commanders of the groups of the first échelon.

It must, however, be clearly understood that the attachment of a supply échelon to each infantry division is not permanent, but only holds good during the continuance of an action, and then the unit is only under the orders of the Staff of the Division, and in no case under the orders of the commanders of units.

The number of units thus placed under the orders of a first échelon group commander varies, therefore, according to the exigencies of the fight, taking care that no units are left idle during the continuance of a fight.

If exceptionally a fraction of the artillery is detached for any special reason, it is the duty of the General Officer Commanding the

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artillery to order the commander of one of the ammunition supply groups to place himself under the orders of the officer commanding the detached batteries.

The General commanding the artillery always retains the supreme control of the system of supply of ammunition, but his authority is not so centralised as formerly.

He has to fix the base of the advanced portions of the supply groups; the hour when the ammunition wagons are to join the infantry divisions; the roads set apart for the ammunition supply columns; and to give orders for sending men, horses and materiel to the batteries in action. Further, in case it is impossible to satisfy the demands of all the commanders of advanced échelons, to decide to which of them supply should first be made.

Composition of an Artillery Park for an Army Corps.

An Army Corps Park contains two descriptions of wagons.

First of all, wagons that can move over any sort of country with the troops and from which supply can be easily made to them. These wagons must be interchangeable with those in use by the troops so as to replace casualties in the same.

Secondly, wagons which only have to move on the roads; these will naturally carry heavier loads than the others.

The number of each sort of wagon will have to be carefully considered so that the supply columns should not be unduly strung out on the road, but at the same time there must be a regular supply of ammunition to the troops.

Artillery supply units.

Assuming that the thirty batteries in an Army Corps are all engaged, and that the expenditure of ammunition in a day's fight reaches a mean of 500 rounds a gun, which makes a total of 60,000 rounds—and this must certainly be considered a maximum. Each gun would, on this assumption, require 188 rounds from the supply colunms.

With two advanced bases for the Army Corps, the distance to be covered by the ammunition supply sections to the battery échelons may be taken as about 6 km. or 4 miles. So that it would take about three hours for a full ammunition wagon from the time it leaves its base to fill up the battery and return.

An ammunition section carrying 1920 rounds of ammunition could deliver $1920 \times 2{\cdot}5$ or 4800 rounds. That is to say, could supply 200 rounds a gun to six batteries (of four guns each). Five ammunition sections would thus suffice for an Army Corps.. But allowing a margin, as the sections would surely be called upon to supply horses and ammunition wagons to the batteries, we might put the requisite number of ammunition sections at six. But this must be taken as an outside number as any further increase would lead to a reduction in the strength of the artillery park.

In order to determine the strength of the artillery park, we take as a basis as already stated, 500 rounds per gun, or a total of 60,000 rounds. An estimate exceeding that of a German Army Corps by

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8000. In order to carry this amount of ammunition about 69 wagons of the 1900 pattern will be required. These would be formed into three ammunition sections and one section for material and for repair. Twelve spare guns would be attached to this latter.

So much for the artillery supply column.

Each section of the infantry supply column might be constituted as follows:—

Thirty-six two-wheeled ammunition carts; each carriage carrying 315 cases of small arm ammunition or 20,160 rounds.

One carriage for hand grenades.

Five carriages for supplies.

For this train 121 horses would be required.

Two of these sections would be required for each Army Corps, *i. e.*, one per infantry division.

The sections belonging to the artillery park would be composed entirely of four-wheeled wagons.

Two of these sections would be required, necessitating a total of about forty-two wagons of the 1900 pattern.

The infantry portion of the ammunition supply column would thus require two first supply ammunition sections, and two sections belonging to the Park, and would require a total of 468 horses with wagons of the 1900 pattern.

The complete composition of the Army Corps Artillery Park would be:—

6 artillery ammunition first supply sections.
3 artillery ammunition supply sections for the Park.
1 artillery repair section.
2 infantry ammunition first supply sections.
2 infantry ammunition supply sections for the infantry Park.
Altogether fourteen units.

There would thus be carried the present regulation number of infantry rounds of ammunition and 23,000 artillery rounds. Requiring a total of 2050 horses if the 1900 pattern wagons are used.

The present establishment artillery carries only 19,350 artillery rounds and requires 2608 horses.

An evident economy in number of horses with an increase in number of rounds carried.

Then follows the proposed detailed instructions for training and exercising ammunition columns.

These are almost identical with those carried out in all armies and need not be translated.

A. H. C. Phillpotts, Colonel, late R.A.

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Notes from "Revue d'Artillerie," May, 1910.

FRANCE.—Weight and Strength of Riding Horses.

There is often a tendency to class horses according to their height. This might be all very well if the animals were all of the same build. But it is also a well known fact that like all creatures of every sort, men, horses, and other animals, that the amount of work which an animal can perform is directly in relation to his weight. That is to say, in proportion to the cube of his dimensions.

But for dissimilar animals, a consideration of his size alone is quite insufficient.

These considerations led to an entirely new mode of classification of riding horses at the horse show in 1910. The Committee formed to divide the horses into three classes went on the principle that a horse called upon to do hard work, at a quick pace, over any sort of country, should carry a weight not exceeding a fifth part of his own weight. Its powers of endurance being greater according to its make and shape, its depth of chest, and the size of its canon bone.

The classification was then made according to the following considerations:—

Horses weighing over 475 kilogrammes (9½ cwt.) with a girth greater than 1·8 métres (6 ft.), were considered able to carry 95 kilogrammes (15 stone) at least, and formed the sixth class without consideration of height.

Horses weighing over 425 kilogrammes (8½ cwt.) with a girth greater than 1·75 métres (5 ft. 9 ins.) were considered able to carry from 85 to 95 kilogrammes (14 to 15 stone), and formed the second class.

Owing to the large number of horses coming under these conditions, this class was subdivided into two sections, one including horses of over 1·59 métres (15 hands 2 ins.) in height, and the other of those under 1·59 métres (15 hands 2 ins.).

Horses weighing over 375 kilogrammes (7½ cwt.) with a girth greater than 1·7 métres (5 ft. 6 ins.) were considered able to carry a weight of less than 85 kilogrammes (14 stone) only.

This method of classification seemed very sensible. Experience will show if it is necessary to make any modification in the different details of the weights and measurements.

These same weights and considerations of shape &c., do at the present moment for a guide to the officers who buy remounts for the army.

It should here be noticed that the question of weight is one that is of special interest for the artillery arm. Weight being a principal factor in power of draught.

This, however, does not imply that animals weighing more than the normal weight which has been fixed as that satisfying the needs of the artillery, should be looked for. The normal weight referred to, which was laid down by Commandant Machart, is about 500 kilogrammes (10 cwt.).

Horses of this description are fairly suitable for quick work, but not able to keep it up for so long as less heavy animals.

At a walk they can do much heavier work than lighter horses.

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FRANCE.—Kites for Observation.

As is well known, observation is carried out to a large extent in fortresses by means of captive balloons, but owing to their expense and difficulties of up-keep at the time of a siege, there would often not be a sufficient number available.

Besides these reasons, very often it is found that the wind just at the time they are required is too strong to allow of their being sent up.

It is then that kites come into play and are able to lift considerable weights, so that they can be made use of for observation.

In order, however, to get a suitable kite, Commandant Dollfus hit upon the idea of having a competitive exhibition of these machines, and he generously handed over 10,000 francs as a prize to the National Aeronautical Society, to whom he entrusted the undertaking of running the Exhibition.

The principal conditions were that the kite should be able to ascend to a height of at least 300 métres (330 yards).

The competitors to be of French nationality, either amateur or professional.

The kites to permit of observation under every sort of condition, and the trials to take place at sea or on land at the discretion of the judges.

The matériel under consideration should be capable of ascending when the force of the wind is such as to prevent the captive balloon being of practical utility; 10 métres a second has been fixed as the minimum velocity of the wind at which kites can be flown.

Since, however, kites that would be capable of being flown at this lowest limit of wind velocity would be too fragile to permit of their resisting a wind velocity of over 20 métres a second, competitors will be permitted to show two different machines.

The force of the wind to be gauged by some instrument such as a self registering anemometer.

The space in which the kites are to be flown to measure 100 métres in length by 50 in breadth.

The weight to be raised to be 2 cwt., including the aeronaut and all accessories.

The height limit (300 métres) to be measured by means of a telemeter, and the kite must maintain this height for at least fifteen minutes.

The matériel must be sufficiently portable, and easily taken to pieces and put together again, and capable of being packed in a space of 6 métres long, and having a section of 1 métre each way.

The total weight not to exceed 14 cwt., without the windlass and drums for the cable.

Fifteen men only to be allowed to assist at each machine.

The points to be awarded are minutely laid down, and after adding these together the winner to be decided by the addition of these points.

A. H. C. Phillpotts, Colonel, late R.A.

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Electric Light and its use in War.

Translated from "Le Spectateur Militaire," of Feb. 15th, March 1st & 15th, April 1st & 15th, 1910.

Narrative of the night operations, battle of Sha-Ho:—

The Russian army, pursuant to order, assumed the offensive on October 4th.

Having ascertained that the Japanese were in occupation of Endonioulou, the Russians determined to oust them, and, after a desperate bayonet fight, the Morsckansk and Zaraisk regiments succeeded in capturing the village. The Japanese troops in another part of the field, had meanwhile launched no less than three unsuccessful attacks. The next day, thanks to the re-capture of Endonioulou, the 17th Corps found itself still in possession of the ground won previously, though this had only been effected by using the whole of the reserve.

Night attack by Japanese on the night 11th-12th October:—

The Japanese, anxious to occupy two hills in the Russian centre, found it too hard a task to accomplish by day. They attacked by night in three lines, having many connecting links with white flags, all the attacking troops having white armlets. Picked men in front acted as ground scouts, who on getting contact with the enemy, lay down without firing. The Divisional General gave the attack signal by lighting a straw fire. At 4.30 the Japanese captured the position, but their twenty-three battalions were all mixed up, and took a long time to re-arrange themselves. If the Russians had had their reserves ready, a different tale might have been told. An electric light apparatus would have given the troops confidence, assured them of the right direction, and prevented confusion.

Loss of Smolenski's guns, night of 13th-14th October:—

The guns were entrenched near Sakhépou on the night 12th-13th. On the 13th they were firing all day, nearly all the officers being killed. A foggy night succeeded, and at 3 a.m. heavy firing was heard in front of the battery; the expected night attack was commencing. Suddenly a dark advancing line appeared, Smolenski reporting them to be Russian infantry retiring. He persisted in his mistake, till he found they were Japanese at 150 yards. His order for "rapid fire" was too late. Shrapnel cannot be used like magazine rifle fire; and in a few minutes the batteries ceased to exist as units; the debâcle was complete.

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Capture of 1-tree Hill by Russians, night 16th-17th October:—

On October 16th the Russians assumed the offensive, but their movement was stopped for fear of a general Japanese attack. The attack of 1-tree Hill began at 5.20 p.m., and it fell before the onslaught of Generals Putloff's and Novikoff's Brigades and the 9th regiment of sharpshooters. The Japanese in vain attempted a counter-attack. At nightfall the order had been given to march on the moon, which was just above the enemy's position. At daybreak the summit was in Russian hands, after heavy lcsses on both sides.

This engagement shows the want of cohesion and harmony between the attacking columns, and also the paramount importance of fighting by night, the want of co-operation between the columns allowed the Russians to concentrate all their fire on one point, and an operation of this kind will have more chance of success if electric light is used.

The fight at Tchaosauling, night 10th-13th October:—

On the 11th the Russian scouts seized a crest, which commanded the Japanese position at 1300-1600 yards. Khaskine resolved to seize the heights. A second crest was taken, but under close fire from the enemy, who hurled rocks at their assailants, it was found impossible to entrench this second crest owing to the rocky nature of the ground. At 9 a.m. the Japanese threatened a serious counter-attack, but the Russians held fast to the ground they had secured. We shall see what might have happened had electric light been used.

Fight of the 9th Regiment of Sharpshooters at Pensihou on October 12th:—

The regiment was sent to reinforce Kennenkampf and march on Ouiniounine. At 1 a.m. the order for assault was given. The Japanese in their surprise hurled hand grenades, stones, and even rifles at the enemy, but they fled after a desperate resistance.

The use of electric light might have made a vast change in the fortunes of this combat.

Application of an electric light service to certain night operations in the battle of Sha-Ho.

Rôle of projectors on the Russian side:—

The Commander of the 17th Corps would have placed his divisional electric light apparatus at the disposal of General Zachtzouk, Colonel Stackovitch having the "Corps" apparatus. The re-distribution would have been:—

1. Divisional Engineers, 1st Division, one projector with outposts, one projector to illuminate position of defence.

2. Divisional Engineers, 2nd Division. One projector for defensive purposes, one sent to Oulijé to show the direction of Kedégou.

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3. One apparatus at Sadonsawpou for Colonel Stakhovitch. If necessary the outposts will fall back on Endonioulou and Siadonutai projectors, watching all the roads in right section.

In the left section the Ouléje projector will watch railway to south.

The second projector will watch approaches between Endonioulou and Ouléje.

On the night 11th-12th the Russians could have entrenched much better by electric light and have kept in far closer touch with the enemy's movements.

On the morning of the 11th the Engineer company of the right section (1st Division) would have set up two projectors north of Liaustigai.

On October 11th the orders for re-taking Endonioulou would have been: One unit to illumine west slope of Endonioulou and the S. and S.W. directions beyond Ouli-Ho, one unit on Liautsigai to throw beams on Endonioulou itself.

On the night of 11th-12th October at 9 p.m., the Japanese renewed the attack, lighting great fires to show their line of advance. At 10.30 their attack was repulsed. The projector at Liaustigai would have been most useful, and the heavy firing into blank darkness by the Japanese would not have taken place. The Morschansk and the Zaraisk would have been assisted in their march by the luminous beams. Dazzled by the electric light, the Japanese fire would have been useless. If both sides had had electric light the advantages would have been balanced and the fight taken place as in broad daylight.

Electric light will not affect bayonet fighting, but it will assist in finding and picking up wounded.

At 11 p.m., in re-taking Endonioulou, the Russians had used up their reserve; this might have been avoided with electric light, which would not exaggerate incidents in the darkness.

Projectors on Japanese side:—

One electric light would have accompanied attack on Iandiovau.

A second on Siadonutai and west of Endonioulou, the third, south border of Endonioulou.

Fourth and fifth towards Kedejou railway to light up east face of Endonioulou and Oulije.

Fight on the 11th-12th October:—

The Japanese Division which attacked the Russian centre might have had the three brigade apparatus orders: Each brigade apparatus will follow its own troops, and accompany second attacking line. The reserve electric light will be under the Divisional Commander. The attack will be at 1 a. m. the two crests will be the objectives. When the first line reaches the enemy, the luminous beam will light up the advanced Russian lines. The second line will follow in the

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light zone. The reserve projector will take part in lighting up the battlefield.

Capture of 1-Tree Hill by Russians:—

Orders for projectors: The Corps Projector with the Chasseur Battalion, the 1st Division apparatus will (1) direct beam on tree during night attack. (2) Retain this position, in order to act as a beacon on which troops can retire if repulsed. The beams on front of enemy's position are to make the Japanese believe that a frontal attack was coming, while they are being enveloped on both flanks. The projector of the 3rd Brigade, in reserve, will serve as the second point of assembly. The electric light would assist the attack and help mixed up companies to sort themselves.

At 9 p.m. the commander of the 3rd Brigade instals an electric light apparatus, and directs beams towards 1-Tree Hill. The commander of the 1st Division leaves one electric light at Ichandiatoun, and posts the second on the hill. The latter will assist the rearrangement of regiments, while the volunteers will attack the summit, with a projector at 100 yards distance the Russians capture the summit, and the electric light assists in the pursuit; at the same time the 1st Division and 3rd Brigade cross their beams and the occupation of the hill is completed.

Rôle of Japanese electric light:—

1. One apparatus near Iondiaoisa to light to north and east.
2. One near west redoubt.

1-Tree Hill would be occupied by electric light, which would check and demoralise the attacking troops.

In the second phase of the fight, the electric light will throw beams in a N., N.E., and N.W. direction, and will light up (1) attack of 3rd Brigade, (2) attack of 3rd Division.

Conclusion:—

During the Russo-Japanese war, night operations were frequent, and both sides would have found electric light of great service; confidence would have been restored and more rest enjoyed by outposts, besides which it would tend to prevent the reserves from becoming prematurely engaged.

The advantages of electric light in the field are:—

1. Increased repose for troops.
2. Efficient aid in the offensive, the defensive, and in pursuit.
3. Ready assistance in retreat by night; especially if a river has to be crossed.
4. Facility of making signals and pointing out objectives.
5. Helps to improve defensive preparations by night.
6. Afford light to troops engaged in demolition of tunnels, bridges, &c., by night.
7. Helps to find and pick up wounded.

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Up to the present it has been only used in fortresses owing to the cumbrous material of which it is composed. Modern equipment will include carriages with large wheels for the two trains, capable of being drawn like other artillery vehicles. Three carriages will be necessary. One for dynamo and petrol motor; one for lamp and projector; one for travelling forge with tools, &c.

Recruiting for the electric light field service should be easy with so many young men passing through the electrical schools.

It must be under the direct order of the commander of the army, who must decide whether to bring it into action or post it with the reserve.

The disadvantage of showing up one's own troops and positions will disappear if the equipment is used in the proper way.

Edward P. Smith, Major, late R.A.

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The new Austrian Mountain Howitzer.

Translated from "Revue Militaire Suisse," January, 1910.

This new type has a calibre of 10 c.m. (3·94 inches). It is of long recoil, and is shielded, the shield being in two pieces, and removable for transport. The howitzer itself and its vehicle were made in Vienna; the actual carriage in Pilsen. Its chief characteristic is that it is divisible into three parts, each of which weighs about 12 cwt.; it is drawn by two horses in tandem.

The order of march is as follows:—The four howitzers with two pack animals each, carrying the ammunition; in the first line another two animals per howitzer; second line two convoys consisting of four ammunition animals each and a cart; second line transport.

Each howitzer marches as follows:—First the lower part of the carriage hooked on to a limber, then the two-wheeled truck carrying the cradle and the upper portion of the carriage, then the two-wheeled truck with the howitzer itself, finally the two ammunition animals and another carrying telephone apparatus. This constitutes a sub-section commanded by a No. 1 with eight gunners and nine drivers.

Putting the howitzer together and coming into action are done under cover whenever possible, orders being given by signs. The truck carrying the cradle comes up as close as possible by the side of the gun carriage, the rear end on a level with the latter's wheels. Four men then lift the cradle by means of shafts up from the truck, which is then withdrawn. The cradle is placed upon the carriage and fixed by clamps. The truck with the howitzer is then similarly manœuvred and comes up level with the cradle; two levers are then placed, one in the bore, and the other at the breech, and six men raise it and lower it into the cradle; then the two halves of the shield are fixed; the howitzer is then brought into position, the spade dug into the ground, and it is ready to fire.

For difficult going each part of the howitzer may be placed on slides. To do this the wheels are first removed together with the axletree, and they are packed upon the trail. Similarly for the truck carrying the howitzer; the wheels and gun are loaded on the frame which rest directly on the ground and sides. Likewise for the shield truck.

As regards mobility; an hour should be allowed for each ascent of 650 ft. or a descent of 1000 feet; if the ground is difficult, these figures would be reduced to 330 and 650 respectively. But of course there are so many factors to vary these figures.

An ascent of 3000 per day must be considered good work.

C. O. C. Hunt, Lieut., R.F.A.

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"Memorial de Artilleria."

Précis of contents. January to May, 1910.

I propose to note briefly a few of the more interesting items contained in the numbers of the "Memorial" above mentioned.

January, 1910.

On November 7th, 1909, the city of Gerona celebrated the centenary of the memorable sieges of that city, in 1809, by inaugurating a monument to perpetuate the memory of its heroic defenders.

The memorial consists of a Doric column of stone, surmounted by a lion, erected by His Excellency General D. Arsenio Linares on the salient of the old bastion of San Francisco.

The Corps of Artillery subscribed towards a handsome bronze tablet in honour of the Spanish artillerymen who perished during those sieges, and another similar tablet was subscribed for by the Local defence corps of Gerona to commemorate the achievements of their predecessors on the same occasion. These tablets are fixed on the face of the bastion, on either side of the royal arms of Spain, which is on the angle immediately below the pillar.

The inauguration was fixed for a date as near as convenient to the 17th October, which is called "Gerona's great day," it being that on which the triple assaults of the French columns were gloriously repulsed.

The monument was inaugurated with every sign of honour, and combined a military display with a general holiday.

February, 1910.

The Museum of Artillery in Madrid (probably the finest in the world) has just received an interesting addition in the shape of the 9-c.m. field gun of compressed bronze, No. 268, which at the opening of the campaign in Melilla occupied the advanced post of Sidi-Hamet-el-Hach, and in defence of which Major Royo and Captain Guiloche, of the Spanish Artillery, lost their lives. The following is an account of the affair by Colonel Dusmet, who was in command of the artillery of the fortress:—

"On the 18th July, 1809, at 9 p.m., being in the advanced post "of Sidi-Hamet-el-Hach, and after having been fighting continuous-"ly all the day, the battery was assaulted by the Riffians, after the "supporting troops had been ordered away by General Marina, who "was present, and fire had ceased. On observing the advance of "the enemy, Major Royo, who was a few paces off, shouted to his "Captain, "Guiloche, we have to die, they are capturing our guns!" "Guiloche answered "we will go there," and both dashed up to the "battery, revolver in hand, where they perished after killing several

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"of the enemy in single combat. Guiloche died clasping a wheel "of the gun, and close to him was Major Royo, and also several "corpses of the enemy between the guns of the battery."

The gun is pitted with the enemy's bullets and stained with blood.

The account does not state whether the guns were actually captured and retaken, or whether the assault was repulsed at the time.

Under the heading of "Miscellaneous" there is a very complimentary notice of the classic Chinese work on the Art of War[1] by the philosophers Sun and Wu, translated by Captain Calthrop, R.A. As the review says "To-day Sun and Wu have given place to "European writers; but their phrases have become proverbs, and their "influence is perceptible in the successes of Japan in the last war."

The editor of the "Memorial" proposes later on to quote further from "this genial work which has resisted immutably the passage "of so many centuries and has formed the minds of so many genera-"tions of soldiers."

March, 1910.

Under the heading of "Our deficiency in Artillery," two important Spanish journals *La Epoca* and *A B C* (which are noted for their official character and for the attention they give to the real needs of the army) have published an important article, which the "Memorial" quotes at length.

The "Memorial" states that the President of the Council of the late Cabinet at a banquet in honour of the Army of Melilla, stated that as one of the first lessons to be derived from the campaign, the Government would apply itself seriously towards furnishing the army with what it required, and especially to an increase of the artillery. What is claimed as needful is the renewal of all the coast and siege *matériel*, and as regards the field artillery, the 200 guns under order for four years with the house of Schneider, will only supply an insignificant part of what is wanted.

The article in the "Epoca" alludes to the fact that foreign countries devote more attention to the wants of Spain as demonstrated by the Riffian war than does Spain herself, and quotes from the "Journal des sciences militaires," which affirms that Spain does not possess half the number of guns required to fulfil the proportion admitted as necessary, not only by powers of the first rank, but by those of second and even of third rank.

It quotes from the "Memorial" of November, 1909, where it was then stated that apart from the regiments and groups of mountain artillery, and one regiment of horse artillery, there only exist in Spain for fourteen divisions of infantry of similar strength to those in other armies, twelve regiments of field artillery with a total of sixty batteries. This allowance of artillery would, in France, correspond to that for four infantry divisions, and the recent regulations in that country have now increased the proportion of artillery to 120 guns per Army Corps. The Spanish Army is, moreover, deficient of field howitzers. There should be, says the French article, an immediate increase of 100 new batteries in Spain.

[1] In the R.A.I. Library.

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The same French review also comments on the ill effects resulting from the delay in providing the new mountain artillery for service in the Riff campaign, and adds that " The best gun is only equivalent to a piece of old metal so long as it remains in the workshops."

There is another paper in the same number on the subject of artillery firing over the heads of its own infantry, which deals with some recent experiments of this kind carried out in Russia.

From the discussion on exercises of this kind it can be deduced that the distance from the point of attack to which the troops under fire dare advance under the fire of the artillery, depends on the degree of accuracy attained in the correction of the fire, whether with percussion or time fuzes; on the amount of longitudinal dispersion of the trajectories, and of the point of burst of the shrapnel; on the configuration of the ground; on the position of the guns with respect to the infantry, and on the range.

In cases where the correction of fire was scrupulously and accurately carried out, where the dispersions were normal and the infantry were arranged in the same line as the position of the target, with ranges from 2000 to 4000 mètres, the result of the Russian experiments fixed 160 mètres as the smallest distance which could be allowed between the hither arm of the zone of dispersion and the infantry in order that the latter should be free from risks. Under these conditions the lower trajectories of the total zone of dispersion pass somewhat above the heads of the soldiers if standing, and if these trajectories have to remain 10 mètres above them (taking the Russian field gun of 7·6-c.m. of 1902), then instead of 160 mètres, the limit must be fixed at 250 mètres.

The comment by the " Memorial " on this is that the experiment offers but small practical value, because apart from the conditions of the test being entirely distinct from those which would occur in war, the experiments, when repeated several times, produce different results.

April, 1910.

This number contains an article on experiments for breaking up guns with explosives which took place, in August, last year, at Cartagena.

The guns were eight S.B. coiled cast iron guns of 28-c.m. calibre.

The explosives used were Picrinite and Trilite, in petards of 500, 200 and 100 grammes. Quick match, slow match and portfires were used, and all came from the gunpowder factory of Granada.

The charge used was of 8·4 kilogrammes distributed in four groups along the bore of the gun, in accordance with a scheme proposed by the factory.

For safety, smaller charges than those calculated were used, as the funds would not run to erecting traverses or blindages.

There are plans showing the means adopted for the explosions, and photographs of the results, which were very complete, the gun and carriage being broken up into a convenient heap of pieces quite handy for removal.

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The letterpress of the article explains with tables the data followed in different cases, and it is worth studying by those interest-in the subject.

Another article in this number gives details of a new Russian mountain gun of 7·62-c.m. (3″) calibre, made of nickel steel, and weighing together with the breech gear nearly 2 cwt. It has an initial velocity of 295 m.s. (967 f.s.). This gun will probably be described more fully in some other translation, so I will not deal further with the present notes which the "Memorial" has taken from the "Mitteilungen über gegenstände des Artillerie- und Geniewesens."

May, 1910.

The issue of the "Memorial de Artilleria" for May, 1910, contains an eloquent appreciation and biographical notice, with portrait, of the late D. Leoncio Mas y Zaldúa, colonel of Artillery, and the talented Director of the Artillery Museum in Madrid, which duty carried with it that of Chief of the Facultative Archives, of the Corps. He was also at the time of his death, which occurred on the 9th May, 1910, President of the second section of the "Junta Facultativa," a very onerous post.

The late Colonel Mas was born in 1853, and after passing through the Artillery College at Segovia in 1866, served in the various ranks, from Lieutenant onwards, in the artillery.

He served with distinction in the first Carlist insurrection in 1872, for which he obtained promotion to the rank of Captain. In 1873 he was again on active service before Cartagena, and was employed later as one of the Committee of Officers who wrote the official account of the siege. He continued constantly in the field until in 1876 the war in the north ended, and received several decorations as reward for his services. In 1882, Mas became a member of the "Junta superior facultativa" for artillery, and wrote the "Practice regulations for field batteries." In 1890, as Major, he passed to the "Consulting council of war," then in 1894 became a professor at the Senior war college, and was the author of a work called "Lectures on military chemistry and industry." After other high appointments he succeeded in 1897 to that which he held up to the day of his death.

No officer could leave a better record of valuable and conscientious work than did Colonel Mas; and the writer of the appreciation we are dealing with, Colonel Teodoro de Ugarte, who has succeeded to the important post vacated by the deceased, speaks in affectionate and generous terms of the great loss to the artillery and to the nation of this valuable officer.

We hope we may be allowed to add our humble contribution to the many other eloquent expressions which have already been made to the memory of an officer whose constant study of the science of artillery must have resulted in advantage to that arm generally.

J. C. Dalton, Major General R.A. (retd.).

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5·3-cm. (2·1-inch) "Bomb Guns" on carriages for use in advanced earthworks, &c.

By Oberleutnant J. Hanika.
Translated from "Mitteilungen, &c., des Artillerie- und Geniewesens" No. 5, 1910.

This is a description of the guns of this type made and tested by Krupp in 1909. Such a gun is for use from the final infantry positions in the assault on a fortress (the Japanese tried to improvise something of the kind at Port Arthur). Its effect is not produced through great energy on impact, but by the explosion of an enormous charge of some powerful explosive.

The gun itself is a smooth bore muzzle loader. For convenience in cleaning, the rear end of the chamber is bored out and closed by a cone and bronze breech screw. The charge is fired by means of a friction tube through a radial vent. On the gun are two trunnions. The left trunnion carries a pointer which shows on a scale on the carriage the elevation of the gun.

The carriage can be traversed 10° either way about a rear pivot. The axletree passes through the sides of the carriage, and wheels are put on the axletree arms when the gun is to be moved. The dial sight is fitted to the right side of the carriage, and has a lengthening piece for use in laying over a parapet.

The projectile consists of a spherical shell filled with explosive. It has a time fuze whose time of burning is slightly longer than the time of flight. The fuze explodes a detonator which in turn fires the explosive. A rod, like the stick of a rocket, is stuck into a cylindrical hole in the centre of the shell; the other end of this rod sticks into the muzzle of the gun. Between the shell and the muzzle of the gun is a plate of metal through which the rod also passes. The rear side of this plate is countersunk to fit over the muzzle. On firing, after the shell has travelled a short distance, the resistance of the metal plate pulls the rod out of the shell and both fall to the ground.

The charge is of smokeless powder, and is fired by a friction tube. On loading, the charge is first put into the gun at the muzzle. Then the rod with plate is put into the muzzle and the shell put on to the top end of the rod. The fuze is screwed into the shell and the friction tube into the vent.

Wheel track	3·2 feet.
The gun can be elevated between	+43° and +80°.
Traversing gear (in either direction)	10°.
Weight of shell	187 lbs.
Weight of explosive charge of shell	92·4 lbs. (approx.).
Muzzle velocity	197 ft./sec. (60 m./sec.).
Extreme range	325 yards.

The use of Optical Laying Instruments

By Oberleutnant S. Hudler.
Translated from "Mitteilungen, &c., des Artillerie- und Geniewesens" No. 5, 1910.

The author points out the difference between laying with open sights and with telescope, and claims the following advantages for the telescope:—

1. The eye has only two points to align—the pointer and the

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target. It no longer has to pick up and focus the notch of the backsight.

2. By focussing the telescope mechanically the pointer and target can both be clearly seen without having to strain the eye by trying to focus points at different distances simultaneously, as is necessary with open sights.

Errors due to the difficulty mentioned above in (2) are avoided.

4. The magnification of the telescope enables difficult targets to be picked up.

The disadvantages are:—Restricted field of view, and the use of delicate and complicated instruments.

Other articles:—

Blowing down ice barrages at Postelbery in Bohemia.
The choice of fire positions for the 24 c.m. (9·5″) mortar M. 98.
The work of the Russian sappers in the defence of Port Arthur.
Finding the centre of gravity of projectiles.

T. C. Newton, Lieut., R.F.A.

The Silencing of Fire-arms.

By Captain O. L. Edl. v-Lehnwalden.
Translated from "Mitteilungen, &c., des Artillerie- und Geniewesens" No. 6, 1910.

The object of silencing fire-arms is to facilitate fire control. An observer in the butts perceives two separate reports at each shot—a sharp report, due to the air-wave at the head of the bullet, and a dull report somewhat later, due to the explosion of the powder gases from the barrel. The greater the difference between the remaining velocity of the bullet and the rate at which the sound travels, the more marked is the difference between the two reports. The head of the bullet rushing through the air makes a wave which is reflected by the earth, sides of hills, buildings, &c. If a shot is fired vertically upwards, the firer does not hear the report due to this wave, unless it gets reflected by mountains, &c. The report due to the powder gases travels with the ordinary velocity of sound (330 m./sec.), and is, therefore, heard later in the butts if the velocity of the bullet exceeds that of the sound.

As the report due to the wave at the head of the bullet cannot be silenced, the question is how to silence the discharge of the powder gases. Various attempts have been made to do this ever since 1890.

The first solution was to make sieve holes or slits in the barrel just behind the muzzle. This was only partly successful in silencing the discharge, while on the other hand the ballistics of the weapon suffered severely through loss of power.

Other designers, amongst them Colonel Humbert in France, tried another plan. Their apparatus consisted of a sort of piston, working automatically on firing, which closed the muzzle the moment the base of the bullet left it. The captive gases then left the barrel through a sort of exhaust box arrangement. The difficulty of regulating the movement of the piston prevented this method from being a success.

The third method depends on the principle of the silencer or exhaust box, as used with explosion engines and motors. In this method, the gases leaving the muzzle do not go straight into the

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open air, but first pass through a chamber of greater diameter than the bore. This chamber is divided into compartments, and through holes in the sides of these compartments the gases finally reach the open air. This is the only method that has so far been successful.

Apparatus embodying the exhaust box principle have been designed by Jacob Börresen, G. Roth, Colonel Humbert, M. Clean, Gavriloff, Genchow, and others. The silencer designed by Hiram Maxim, although the most successful up-to-date, also embodies this principle—no new one to the expert.

This silencer consists of a metal cylinder divided into compartments by curiously shaped partitions, and is screwed on to the muzzle. The gases first expend into a large chamber of the same diameter as the cylinder, and from this they pass gradually into the compartments, and thence out into the air. The eddying movement imparted to the gases and their gradual expansion silence the report of discharge. The result of experiments with Maxim's silencer may be summarised as follows:—

The silencer is 5·5″ (14 c.m.) long and weighs nearly 10 oz. (280 g.). This weight on the muzzle moves the centre of gravity further forward and tires the firer, though the increased weight slightly lessens the recoil.

The bayonet cannot be fixed in the present way when the silencer is in use.

Wtih long rifles, the silencer does not alter the initial velocity. With carbines and short rifles, the initial velocity is increased by an almost inappreciable amount.

The accuracy of the rifle is not altered, but the point of impact is altered in a negative or positive sense according to the weapon used (rifle or carbine), up to as much as 27½″ (70 c.m.) at 100 paces.

The heating of the barrel and silencer is most noticeable. This makes the air quiver over the silencer so much that it is impossible to take an accurate aim. The length of the silencer also blocks the line of sight at long ranges.

Experiments in the U.S.A. with a detachment of 24 rifles, showed that the voice remained audible within the detachment.

Other experiments with single rifles have shown that the report actually is efficiently silenced.

Taking the case of the infantry rifle, if we contrast the advantage of silence with the various disadvantages (alteration of point of impact, inability to aim at long ranges, and more especially the quivering of the air over the silencer, rendering an accurate aim impossible after a few shots, finally the increase of weight), we come to the conclusion that the problem of silencing is not yet satisfactorily solved for military purposes.

We must further bear in mind that the bayonet and the silencer cannot be used together, that the silencer must be correctly screwed on, or the bullet will touch the partitions in it, and that the rifle with silencer requires very careful handling to avoid damage to the latter.

The silencing of guns or machine guns is hardly likely to be successful on account of the size and weight of the silencer that would be required.

In the case of guns, the increased length would be a great disadvantage in driving over rough ground; and artillery under cover

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is already hard enough to locate in spite of the noise.

With regard to machine guns, the efforts of all powers using them have been directed to lightening them and rendering them more mobile. To silence them would be to increase their weight. Apart from this, we must first decide whether the good moral effect of the noise of the machine gun on our own troops, or the advantage of surprise machine gun fire, is of the greater value to us. Perhaps a removable silencer would enable the machine gun to fulfil both conditions.

Experiments would be required to determine whether the silencer had the same disadvantages when applied to a machine gun as when applied to a rifle. Probably an efficient cooling apparatus could remove some of these.

The silencer would probably be of great value on the range, making instruction easier.

FRANCE: The new 5·2-inch (65 c.m.) Mountain Gun.

The gun has differential recoil and is run forward by springs.

The gun is of jacket construction, has an eccentric breech screw, and is fired automatically when the gun is in the forward position. In case of a missfire the gun can also be fired by hand.

The running forward gear consists of a spring cylinder on either side below the gun and connected to it. The spring cylinders slide in the cradle, which is connected by two trunnions with the carriage. The trail can be used short or long, giving maximum elevations of 35° and 24° respectively.

The elevating gear is a simple screw worked either side of the trail. A trail anchor is carried which is hammered into the ground before firing. Dragshoes are also placed under the wheels before firing.

For draught work the gun has a small third wheel and a pair of shafts which can be fitted to the end of the trail.

For travelling, whether by draught or pack, the running forward gear is relaxed. The gun is drawn back to the ready position before firing by two men by means of cogs and racks on the spring cylinders.

Fixed ammunition is used, shrapnel and explosive shell, both with time and percussion fuzes. The ordinary fuze-setting machine is used

Weight of gun ready to fire	860 lbs. (390 kg.).
Weight of shrapnel or explosive shell	9·8 lbs. (4·45 kg.).
No. of bullets—38 to the pound	138.
Percentage of effective weight of shrapnel	37·2%.
Weight of complete round	11·5 lbs. (5·25 kg.).
Muzzle velocity	1080 f./s. (330 m./s.).
Elevation	between − 10° & + 35°

The range table goes up to 5450 yards (5000 m.), which is reached with an elevation of 22° 39′.

The gun and carriage is carried on four pack animals.

Eighteen rounds form a load, and are carried in two large carriers of nine each, weighing approximately 132 lbs. (60 kg.) apiece.

This gun will be described in greater detail in the July number.

ITALY: Regulations for Infantry Machine Gun Detachments.

The infantry machine gun unit is two machine guns. It is not

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open air, but first pass through a chamber of greater diameter than the bore. This chamber is divided into compartments, and through holes in the sides of these compartments the gases finally reach the open air. This is the only method that has so far been successful.

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ITALY: Regulations for Infantry Machine Gun Detachments.

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intended for independent operations. Administratively and tactically it is under the regimental commander.

The personnel consists of 1 senior subaltern, 4 N.C.O's, 1 bugler, and 23 men. The material is carried on 28 mules, and divided into the "fighting detachment" and the "reserve detachment." The former is divided into the firing line and the ammunition line.

The mountain machine gun unit also has a special 2-horse wagon to increase its independence.

It is laid down that the fire of only one gun is to be used at a time, that of the other being held in reserve. The reason given for this is the rapid heating of the barrel and the frequent jams. It is further stated that the fire of one machine gun at a time is sufficient. this view is opposed to that of certain Italian military writers.

All ranks must be proficient in judging distance.

The commander of the unit observes fire. The use of binoculars is recommended. No mention is made of flank observers, or the transmission of orders and messages by means of signallers.

Fire may be either "interrupted" or "continuous." With the latter 500 rounds a minute are fired; with the former, 20-25 rounds in 3-5 seconds.

Interrupted fire is used for ranging, and also for firing a few shots at a clearly visible target. This is directly opposed to the German regulations, which lay down that interrupted fire is to be used for difficult targets.

The barrel is changed after every 4000 rounds.

As regards tactics, great stress is laid on the necessity for close co-operation with the infantry to which the machine guns belong. In open country, all orders as to the use of the machine guns come from the regimental (brigade) commander; in mountainous country from the battalion commander.

Machine guns are of special value in places where artillery for any reason cannot fire effectively.

The chief tasks of the machine gun according to Italian ideas are the preparation of the bayonet attack, firing at surprise infantry targets at medium range, and finally the pursuit.

Fire against infantry targets is regarded as effective up to 1000 metres (in Germany only up to 800 metres).

Infantry in close order can be fired at up to 2000 metres, though this is expensive in ammunition. Fire against artillery can only be effective when the latter have no shields. In this case artillery in action can be fired at up to 1500 metres. Machine guns should not be drawn into a fight against hostile machine guns.

The regulations do not mention cover for machine guns. In this matter they are in sharp contrast to the German regulations, which enjoin the immediate construction of cover when in action.

T. C. Newton, Lieut., R.F.A.

The Operations round Melilla in 1909.

Translated from "Revue Militaire des Armées Etrangères," April, 1910.

Part II. Operations.—The information given in this article is collated from Spanish and foreign journals. No official Spanish account having so far been published.

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Five maps enable the reader to follow the operations from 9th July to 30th July with ease. The preparations for the investment of the Gurogu position which were made between 1st August and 15th September, are explained, and the course of the campaign carefully followed until peace appeared in sight towards the end of the year.

Part III. gives an excellent summary of the working of the various arms and departments during the war.

The Spanish army and nation have had a valuable experience in this war.

R. H. Hare, Major, R.G.A.

The German Imperial Manœuvres of 1909.

Translated from "Revue Militaire des Armées Etrangères," May, 1910.

The article is concluded in this number. The operations of both sides on the 16th and 17th September, are closely followed, and the article ends in General Observations on (i.) "The Directorate of the manœuvres and umpiring." (ii.) "Strategical and Tactical plans. Employment of the different arms." As regards the former, the situation created by the "General Idea" had a character of novelty which originated in the desire of the great General Staff to realise the conditions of a great war. The problems set to the armies of two imaginary states on a declaration of war involved concealment of their movements, distant reconnaissance, concentration and avoidance of neutral territory.

Red had a superiority of 22 battalions and 15 field batteries which was not balanced by Blue's superiority of 10 squadrons of cavalry. Blue, however, was more concentrated than Red. Blue's cavalry endeavoured to break through Red's covering troops and the other divisions in detail, but Red's determination to avoid action until concentration prevented this. The general tactics of the fight assumed during the course of the manœuvres were the character that one sees usually in Germany. On the defence, wide fronts (3 miles to a division) strengthened with works actually dug, with reserves in rear and beyond the flanks intended for the counter-attack. In the attack, a general engagement along the whole front preparatory to a movement designed a priori against one flank of the enemy. The covering troops were equally distributed all along the frontier and there was no large reserve. Theoretically the operations should have been continued without interruption, but as a matter of fact, the troops camped each day at a comparatively early hour. With the exception of the surprise of a brigade of Blue cavalry by three companies of Red infantry, there were no night operations worthy of note.

The infantry marched well in a hilly country, the roads being broken up and the weather vile. The 30th Division covered 58 miles in three days, and the 14th Corps 82 miles in four days. It is necessary to add that the troops were very tired by the end of the manœuvres and many men fell out during the march home.

Two points in the action of the cavalry are worthy of note. On both sides this arm stuck to the wing of their armies without appearing to look for opportunities of decisive action one against the other, or of delaying by action against their flanks the advance of hostile columns or lines.

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The second point to note is the extensive use of dismounted cavalry action against cavalry and against the other arms. Fire was opened at long ranges and maintained until the moment of the infantry assault. The broken nature of the country lent itself to such action, but it must also be remembered that the new regulations lay great stress on dismounted action. This will increase with the introduction of the new carbine, called the 1898 model, of which the back sight is graduated to 2000 metres, and which is provided with a bayonet carried by the horseman on the left side of his belt—while the carbine is carried on the left side of the saddle, and the sword on the right.

As regards the artillery, the batteries consisted of four or six guns. They had no wagons with them, as is usual in the German manœuvres. The artillery appears to be imbued with the spirit of the regulations, "above all things to support the infantry." It appears to have a preference for direct positions. It was not unusual during these manœuvres to see units come into action in the open without making epaulments.

Light and heavy howitzers were employed normally. The light howitzers occupy positions in a manner similar to field guns. Heavy howitzer batteries take up positions behind the line of field batteries and appear to prefer indirect fire. In spite of unfavourable circumstances, such as very broken, very muddy ground, much soaked with presistent rain and cut up roads, the heavy batteries never failed to reach the positions allotted to them.

No cyclist unit was employed on these manœuvres.

Experiments were made with mules and special wallets of leather for facilitating ammunition supply.

The bad weather experienced during the manœuvres prevented the realisation of the hopes that the dirigible Gross II. had raised. Rain, wind and fog, prevented it showing what it could do. On one occasion it was undergoing repair in hostile country. The Zeppelin III. was sent for from Frankfort, but did not arrive until the conference was over. The wireless instalation of Gross II. gave satisfaction, and the envelope gave proof of powers of resisting bad weather.

Communications.—The German army is plenteously provided with means of communication of all sorts, of which great use was made during these manœuvres. On either side a wireless detachment connected Corps headquarters and cavalry Corps or divisional headquarters to one another, and to Army headquarters. Telephonic or telegraphic communication was similarly established.

The weather, which was alternately and sometimes simultaneously, wet and foggy, hindered visual signalling very much. In the artillery all brigades and batteries had telephones peculiar to this arm. On the march each instrument is carried by a mounted man in a special bag. By its means the fire of batteries can be directed from a distance, touch being also kept with the brigade commander. No great use was, however, made of it.

These methods of communication were duplicated by means of orderlies, cyclists, motor-cycles and automobiles.

Motor-cycles did not give satisfaction, and a strong, reliable and swift type of this vehicle has yet to be found.

As a rule troops on manœuvres bivouac. This year a departure

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was made from this rule and troops bivouacked, or were billetted, according to circumstances.

There were innovations also in the method of supply. Supply columns were replaced by a system of local purchases. Cavalry regiments bought their own forage.

The result was a great improvement in the supply service, but the greatest of all was realised by those units who had the field "cookers" or travelling kitchens (Feldküchen).

Those officers who saw the travelling kitchens on manœuvres in England in 1909 have realised what a necessity they are.—Translator.

R. H. Hare, Major, R.G.A.

Veterinary Health Return for the German Army.

Translated from "Revue Militaire des Armées Etrangères," May, 1910.

The statistics re-affirm that the army horses are more and more subject to illness caused by the excessive fatigue that they suffer. For many years brigade manœuvres hardly begin, even for cavalry patrols, before 7 a.m. and terminate at 3 o'clock or later. In reality the horses are under the saddle from dawn, and day falls while squadrons and batteries are still on the road to their shelter for the night.

Divisional and Army Corps manœuvres add to what is required of them, and the consequent fatigue, hunger and exposure, weaken the animals to such an extent that in many a regiment it could be said that, after the manœuvres, the horses are hardly fit for field service. The winter season was formerly devoted to courses, or the riding school. It is now broken into by winter exercises, tactical exercises, endurance trials, and night work of which the cold and frost reduce the strength and condition of the horses. In summer there are manœuvres at camps of instruction much more important and fatiguing than in the past, as well as the cavalry manœuvres which, taking place before the combined manœuvres, have tried severely the horses' powers of endurance. As a result illness has increased to an alarming extent, to deal with which the Inspector General of Cavalry has taken the following measures.

1. An increase of the hay ration.
2. Shortening of the duration of brigade and divisional manœuvres.
3. The abolition of bivouac for mounted troops.

R. H. Hare, Major, R.G.A.

Revue de l'Armée Belge.

Précis of Contents, March and April, 1910.

The place of honour in this number is given to an interesting lecture by Colonel De la Llave, Spanish Royal Engineers, before the General Staff, Artillery and Engineer officers of the Bulgarian army, at Sophia, in 1908.

It being the Centenary of the outbreak of the Spanish War of Independence, the lecturer chose as his subject the four events which, among all the heroic exploits in the history of the war, stand out, in his opinion, as the most glorious.

The first of these was the rising, on the second of May, 1808,

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of the Madrilenos, led by two patriotic captains of artillery, who ventured to disobey the orders of a francophile Spanish minister confining the troops to barracks. These officers opened the Artillery Park and served out arms to the citizens, who, with the help of a few guns, held the Park against the repeated assaults of the French, until overwhelmed by superior numbers. Murat crushed the rising by shooting many of the inhabitants, but the flame was kindled beyond extinction.

The second event was the decisive battle of Baylen, when General Castanos, with an army largely composed of irregulars, cut off the retreat of the French after the sack of Cordova, interposing his troops between Dupont's division, which had fallen back on the mountains, and that of Vedel, which was hurrying to his assistance. This battle, ending in the capitulation of the entire French force in Andalusia, led to the evacuation of Madrid by the French, their retirement across the Ebro, and the raising of the first siege of Saragossa.

The third incident was the defence of Saragossa by General Palafox, when that town was besieged for the second time. During the five months following the victory of Baylen much had been done by the inhabitants, stiffened by a certain number of regular troops, to strengthen the fortifications, and store ammunition and food. After suffering heavy losses during a month of sapping and bombard ing, the French gained a footing in the town; but this may be said to have been but the beginning of the siege. Street by street, house by house, even floor by floor, the Spaniards fought to a finish, making the most of the advantage their "espadrilles" gave them over the French (who wore shoes) in scrambling across the tiled roofs. The heroic defence of the town was ended as much by disease as by the losses inflicted by the enemy.

The fourth incident selected was the defence of Girone by General Alvarez de Castro. As in the case of Saragossa, there were two sieges; the first by 8000 French, under General Duhesmes, who anticipated no resistance from such an insignificant little town, and proposed to place it in a state of defence to protect his communications with Figuières. In spite of the ruined state of the fortifications, the garrison, consisting of 300 soldiers, 150 sailors acting as gunners, and 1500 badly armed citizens, kept Duhesmes at bay for two months, until the approach of the Count de Cadaquès with several thousand regular Spanish troops and village levies caused him to raise the siege. The second siege began eight months afterwards, in May, 1809, and was on a far larger scale. 15,000 French troops, under St. Cyr, invested the old fortress on lines extending between 25 and 30 miles. The garrison consisted of the Ultonia and Burbon Regiments of infantry, some battalions of volunteers, and several irregular companies composed of citizens of various trades, including one of monks, one of secular clergy, and one of women, named the Company of St. Barbara, commanded by a heroic lady, wife of a captain in the Ultonia regiment. Marshal Augereau relieved St. Cyr in the following October, and, aware of the privations and sickness of the defenders, contented himself for a time with maintaining the blockade. In November, no less than 1378 officers and men died in the devoted town. Alvarez himself received the last sacraments, on the 19th

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December, and Bolivar, who succeeded him in command, not being bound by Alvaraz's oath never to surrender, and seeing the desperate state of the garrison, capitulated on the following day, after a defence lasting 219 days.

Other articles:—

The application of motor transport to the supply of a Division. The tables comparing the personnel and materiel of horse and motor transport are interesting; a saving of 100 N.C.O's and men and over 300 horses is effected by mechanical transport, while the distances which motor vehicles can cover, and the speed with which they can move, should simplify considerably the difficulties of food supply.

The theory and employment of the Stroobants Telemeter.

The question of Mitrailleuses, Machine Guns, and Automatic rifles in various armies. Chapter 5 discusses the regulations for the use of machine guns in the armies of Germany, Austro-Hungary, Spain, and Japan.

Collective and Individual rifle fire.

The Belgian Grand Manœuvres of 1909.

The theory of Gymnastics.

New Q.F. guns for Horse Artillery, designed by Schneider and St. Chamond. The former is a 12-pr., 2·8″, 30 calibres in length. It is claimed that 30 rounds per minute can be fired, with a m.v. between 1580 and 1640 f.s. The maximum depression is -10°, maximum elevation 16°. The cradle admits of 3° traverse each side of the line of fire. A goniometric sight and automatic fuze-setter are provided. 34 rounds are carried in the limber and 62 in the wagon.

The latter is also a 2·8″, of 26 calibres, rifled with 28 grooves. The recoil buffers, &c., in the cradle are protected against rifle fire and dust. The m.v. is 1510 f.s.

Remaining velocity at 1093 yards (1000 metres) 1130 f.s.
" " 2186 " " 950 f.s.
" " 3280 " " 523 f.s.

30 rounds are carried in the limber and 56 in the wagon.

In both types the shell are pigeon-holed vertically in the limber boxes, which are up-ended in action.

A. H. Webb, Capt., R.G.A.

An attachment for the wheels of Heavy Artillery Carriages

Translated from "Revue Militaire Suisse, May, 1910.

This attachment is formed of jointed pieces, which constitute a band, or belt, to be fixed round the wheel tyres, so as to increase the wheel's bearing surface on the ground; the wheel is thus made to travel over a track laid by itself, as it revolves; thanks to the width of the blocks forming the links, as it were, of the band, the heaviest guns may be taken over sand, boggy soil and wet ground, without the wheels sinking in. They also serve as platforms whilst " in action".

The value of this invention can hardly be overestimated, for heavy guns it is indispensable.

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The inventor is Major Bonagente of the Italian Army, but Krupp has materially improved the original design; the jointed plates being now made of steel, instead of sheathed wood, whence greater resistance, with less weight and, moreover, owing to their being so much thinner the outer surface of these plates are brought nearer to their pivots; so that there is less friction with the ground before becoming the bearing surface for the wheel. The gun is not raised so much either. The attachment is intended only for the gun carriage wheels and not for those of the limbers; and of course would not be employed on good roads, for its weight is considerable, 6 cwt. for a 4·7″ gun, and 7½ cwt. for a 5·9″ gun; it diminishes the pace and of course wears. It can easily be transported, and Messrs. Krupp have designed a special carriage for it which will carry four, *i. e.*, for two guns, together with spare parts, and the necessary tools to fix and unfix this attachment. It must not, however, be thought that the addition of two of these special vehicles is a disadvantage; for these jointed rims allow vehicles for the carriage of platforms to be dispensed with; so that in a 4-gun battery there is really a saving of two vehicles at least, and possibly six, according to the nature of ordnance. These jointed rims thus fulfil a double purpose.

Trained men can fix this attachment in six minutes, and it is quite a simple operation.

It must be confessed that it makes a considerable noise on the march; attempts have been made to silence it, but without success.

A modification of brakes has been necessary as they can now no longer act on the tyre. Krupp has made two models; one consisting of a metal circle adjoining the inner face of the nave on which act the brake blocks; the other is formed of claws fixed against the inner surface of the felloe, and supporting a ring against which the blocks work.

Tests both as to marching and firing have been carried out, three rounds were fired with a siege gun (4·7″) on a fixed carriage at 3°, 5° and 8°, respectively, on ordinary soil. At the first round the gun recoiled 11″, at the second ¾″, at the third round nil. The jointed tyre stood the test perfectly. This same gun was then taken over two miles on a muddy road, one-third of a mile without stopping, then two-thirds of a mile across sandy country; the gun wheels did not sink in, and four horses were able to draw the gun without difficulty. A 5·9″ siege gun was then taken 10¼ miles. The shooting of these guns, provided with detachable jointed tyres, proved excellent. Tests have been carried out over freshly ploughed land, boggy and swampy country with the most satisfactory results.

Plate II. shows a siege gun (4·7″) being taken across shifting sands and wet ground with reduced teams. It will be seen that the wheels with their attachments sink very little into the soil.

The independence which this jointed tyre thus confers upon heavy ordnance, in making platforms unnecessary, will greatly facilitate their use in the defence as well as the attack of fortifications, by allowing of a frequent and rapid change of position.

Siege artillery will gain immensely by this innovation.

C. O. C. Hunt, Lieut., R.F.A.

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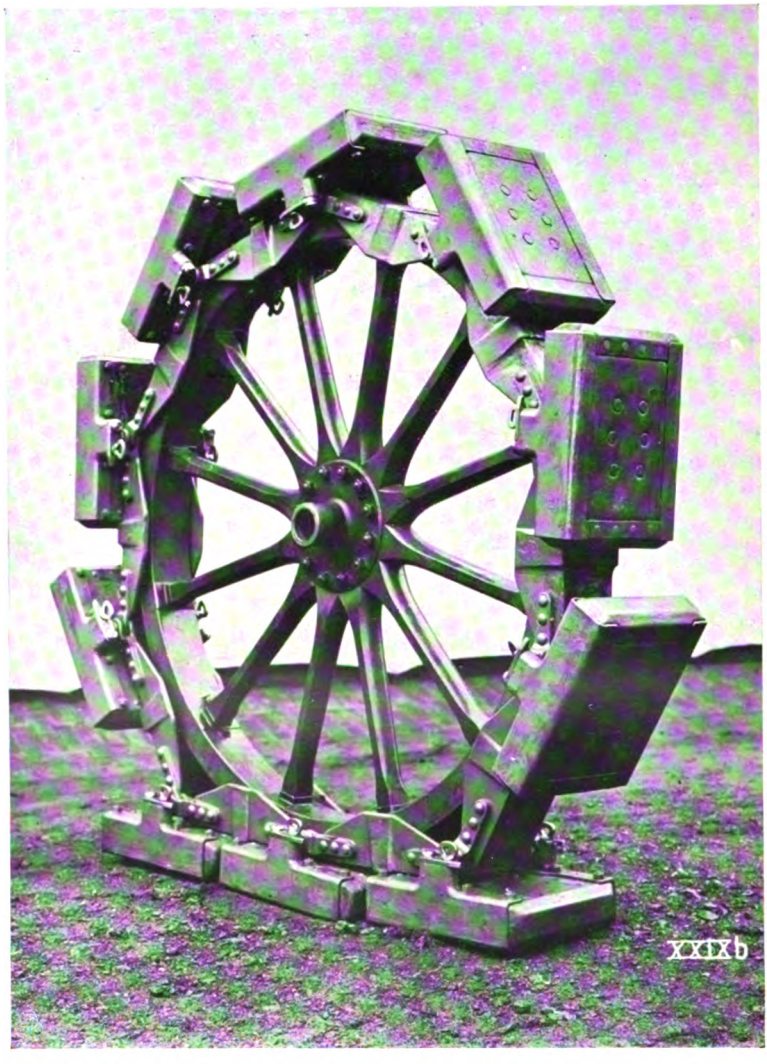
PLATE I.



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The Military Train.—An Episode in our late War.

Translated from "Russki Invalid," Supplement to No. 90 of 1910.

On the 21st April, 1904, the Japanese transports disembarked at Bidzevo, situated on the eastern side of the Kwang-tun peninsula.

The Viceroy, Admiral Alexeieff, handed over the fleet to Admiral Witgift and left Port Arthur precipitately, fearing to be cut off from the army.

The Commander-in-Chief, General Kuropatkin, moved a detachment under the command of General Zweekoff towards the place of disembarkation. The detachment consisted of a battalion of infantry (Lieut.-Colonel Ranzeff) and two squadrons and two troops of cavalry (Colonel Denisoff), and on the morning of the 22nd April it arrived at Wafandian, 60 versts from Bidzevo. At Wafandian there were, in addition, details of the 8th Corps of frontier-guards.

On the 22nd April, General Zweekoff sent his cavalry with scouts in all directions, to reconnoitre the country ahead, and he ordered Colonel Ranzeff with his battalion of rifles to reconnoitre towards Bidzevo. He himself remained at Wafandian with his staff. At the same time, General Foek, commanding the advanced posts of the garrison of the fortress of Port Arthur to the south, sent out a mounted party of the 13th East Siberian Rifles under Staff Captain Voight, from Kin-jou towards Bidzevo (75 versts), also with the object of reconnoitring.

The state of affairs at Bidzevo at this time was as follows:—

The Japanese, having disembarked two or three companies were forced to discontinue further disembarkation, as a typhoon had suddenly sprung up and blown the ships away from the shore. It was well known by the natives that, so long as the typhoon blew, not a single ship either would or could approach the shore. Staff Captain Voight was the first to reach Bidzevo.

From the summit of the surrounding volcanoes Voight could clearly see all that was taking place, and boldly opened fire on the companies which had landed. After their first surprise, the Japanese guessed from the fire that the Russians were few in number. Wishing to gain both the position and time, the Japanese proceeded to the attack and severely pressed Voight's detachment. Voight commenced to retreat northward, without haste and clinging to every available position, expecting to receive supports which would enable him to throw back the enemy on Bidzevo and capture the place with all the preparations that had been made for the disembarkation.

Voight's calculations appeared to be correct. At 15 versts from Bidzevo, messengers sent out by him to the north met Ranzeff's battalion and reported this to Voight. Ranzeff ordered Voight to move to the west, while he himself evidently not believing the report of the smallness of the enemy's force which had landed, retreated, and on the morning of the 23rd his battalion reached Wafandian, wearied with a march of 70 versts.

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The Japanese, knowing nothing of Ranzeff's battalion, continued the pursuit of Voight's detachment right up to the station Pou-loun-dian. Here under the protection of the detachment was the last train from Port Arthur. The Japanese, thanks to the brave defence offered, were not able to capture the train, but they succeeded in opening fire on it, although the train was flying the " Red Cross" flag.

At last Voight, seeing that he was left alone with his detachment which was worn out with fatigue, retreated to the north and arrived also at Wafandian.

At Wafandian there was nothing short of a panic. The arrival of the hospital train, which had been shelled, the news from Colonel Ranzeff, which he had obtained from the Chinese, that a large force of the enemy had already landed, all created a feeling of despair. In vain did Voight with tears in his eyes, try to explain the true position, they did not believe him. Preparations were made for a general retreat, instructions from headquarters only being awaited.

Such, in a few words, but without omitting any essential point, was the condition of affairs when, on April 23rd, a train arrived at Wafandian with a detachment of officers and soldiers of the Railway Corps under the command of Lieut.-Colonel Spiridonoff.

Spiridonoff had been ordered by Colonel Sakharoff in charge of communications, to evacuate stations after the retreat bringing back all the gear it was possible to get hold of and to destroy the remainder.

Spirindonoff at once grasped the situation, believed Voight's report, and in spite of the most woeful predictions, decided to reconnoitre with his engine to the south towards the station which had been seized by the enemy. This reconnaissance with a locomotive alone, so far unprecedented in the history of war, was crowned with complete success.

It was discovered that the Japanese, having seized the stations Pou-loun-dian and Sau-she-li-pou, lying between Wafandian and Kind-jou, had destroyed them, slain the guard, and having blown up the bridge to the South of Pou-loun-dian had retired to the place of disembarkation, where they could entrench themselves and await the expected attack of the Russians.

Spiridonoff by questioning the Chinese in the neighbourhood was convinced that the disembarkation could not be renewed for some days yet, provided the typhoon continued to blow.

After an examination of the road by Engineer Vishnyakovski, who accompanied the engine, it was ascertained that the damage to the bridge and the line would take some hours to repair and the line to Port Arthur would then be open.

The whole of this bold reconnaissance took five hours. What was the astonishment of Spiridonoff when, on his return to Wafandian, he discovered it all in flames, the water tank had been destroyed, the telegraph apparatus removed, even the points had been taken away. The warehouses and buildings were burning. Everyone had fled. Only the detachment of soldiers which he had left under Lieut.-Colonel Floroff remained.

It appeared that after the departure of Spiridonoff, reports had reached Wafandian that both he and the engine had been captured by the enemy, and that the latter was advancing north. Thereupon

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General Zweekoff received permission to retire.

Having filled the engine with water from a pool with their forage caps, and having replaced the points with wooden ones, Spiridonoff's party proceeded north as far as the next station Wafangou, where he reported the whole matter to Liao-yan by telegraph.

They replied to him, that the landing must be taken as an accomplished fact, that the whole world had been informed that Port Arthur was cut off, but the news that the line was open to Port Arthur was very important, inasmuch as it was desired to send a large train with ammunition and machine guns into the besieged fortress. Spiridonoff enthusiastically guaranteed the success of the undertaking. On the 24th and 25th April Spirindonoff drove about to various places on the line, repairing damage to the permanent way which had been actually seized by the Japanese. The typhoon was his sole ally.

The Commander-in-Chief frequently changed his mind with regard to the engine, fearing lest such a valuable convoy should be captured by the enemy. Only when Spiridonoff staked his honour that in case of non-success or an attack from the Japanese he would blow up the whole train, was permission finally granted.

The actual journey of the train was never once mentioned in official despatches, but sketches by his talented coadjutor, V. E. Nemirovitch-Dantchenko, representing Lieut.-Colonel Spiridonoff in charge of the train, were hung up in every company in the Russian army, with a full description which could be understood by every soldier. But at the present time it is only necessary to say that the most reliable officers of the detachment were disposed at different points of the train, with prepared charges of dynamite, &c., and with strict injunctions from Spiridonoff to blow up the train on the first sight of the enemy.

These officers and the rank and file in subsequent engagements gained for themselves great renown, and all were decorated with the military cross, with the exception of Under-Officer Boltniak, who took part later in General Renenkampf's punitive expedition and perished at Chila, when heroically blowing up mines which had been placed on the railway line.

Spiridonoff knew well into whose hands he was entrusting his honour.

And so, if it had met with failure or an attack from the Japanese, the great train laden with ammunition would have come to a fearful end, to the glory of the Fatherland, and the name of Spiridonoff would have deserved to rank with Russia's greatest heroes.

But the success that was achieved by this brave man, at so terrible a risk will linger long in Russia's history, and will ever remain as an example to the army of noble self-sacrifice.

At a point 70 versts up the line the train sped by within a day's march of the enemy's position, carrying with it the necessary munitions of war, without which Port Arthur could not have struggled so long with her powerful foe.

Generals Kuropatkin and Foek, the former by telegraph and the latter personally at the station Kind-jou, where the journey was completed, both applauded the famous deed and proclaimed Spiridonoff a hero.

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Cyclists as Escort for Artillery.

Translated from "Journal des sciences Militaires," 15th February, 1910.

Artillery, the humble servant of infantry, fulfils its mission by fire and manœuvre. Although fire is always the action par excellence of artillery, the faculty of manœuvring has now more and more become an eminent quality; it is this which allows it to identify its action with that of the other arms on the battle field.

Thus artillery will act, partly by fire, partly by manœuvre. But to give it full liberty of action, infantry must ensure its constant and complete security. Not only must artillery move in an atmosphere of security, but there must be guarantees against the slight accidents and surprises of the battlefield which may occur even under the most favourable circumstances. This is ensured by detailing a special escort.

While manœuvring, cavalry carries out the duty, but even when operating with fire tactics the power of cavalry is inferior to that of infantry.

Cavalry deprived of its horses cannot assume the offensive.

It is impossible to imagine that infantry can follow artillery and protect its movements as it can when in position. Suggestions have been made that when operating with artillery or cavalry, transport should be improvised; but this is surely quite impracticable. And no artillery would undertake the responsibility of holding on charge a number of vehicles wherein to carry infantrymen. To begin with, it would enormously add to the already long length of column on the march.

Another solution is mounted infantry. Unfortunately mounted infantry are too few in numbers.

The same difficulty occurring in all European armies all have been imbued with the same idea, viz: to form cyclist units instead of mounted infantry. The question is:—Is the cyclist company partaking. as it does, of the solid nature of infantry and the mobility of cavalry, is it suitable as a substitute for these two arms to furnish an escort to artillery under like circumstances?

The truth is infantry cyclists can replace neither cavalry nor infantry. Cyclist infantry can only be described as endowed with great mobility under certain circumstances.

The great weakness of cyclist infantry lies in its formations. Imagine a company of 200 in fours marching as cavalry about six to seven miles per hour, and think of what would happen should a tyre burst or an accident cause men to fall. To minimise this, intervals must be increased, up to perhaps 7½ to 9 yards, if the pace is a fast one and on bad roads. 200 men would occupy 660 to 770 yards in column; the battalion, including necessary distance between companies, nearly 2 miles.

Then cyclist infantry is tied to the roads, and, it may be added, to good roads; of course it can use narrow and inferior roads, and over exceptionally favourable ground even go across country. But

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ordinarily, in the absence of good roads, the only resource is to push or fold up the bicycle, when it becomes ordinary infantry; leaving its bicycles it becomes light infantry; carrying them very heavy infantry; in either case a power not to be despised remains to it.

Third and principal weakness, blindness, or if not absolute blindness nearly so, which exposes it to continual danger when left to itself. A cyclist company on a good road moving at 7 to 8½ miles per hour, in column 350 yards long, will be preceded and followed by patrols and scouts; but what about its flanks? Flanking patrols are impossible. Two hostile horsemen hovering about could hardly resist the temptation of dismounting and pouring the contents of their magazines into such a fine target defiling before them. The strong body passing before them is perfectly helpless against this. The remedy seems to be to detail one or two horsemen as flankers.

The speed of the cyclists need hardly thereby be diminished, for the horsemen could quite keep pace, remembering that there will often be turns and bad places in the roads.

Artillery attached to a cavalry unit, substituting a cyclist company for a cavalry squadron:—

The fight against cavalry. During the approach horse artillery conforms to the movements of the cavalry, keeping to the roads as long as possible; by asking its batteries to make too long a march across country, cavalry exhausts them. Except in extreme cases of urgency a divisional commander would so arrange his marches into position as to allow his artillery to utilise the roads. The cyclist company could then conform to the movement at the pace of the remainder.

Difficulties only begin when horse artillery is obliged to leave the road to manœuvre across country in combination with cavalry.

This will generally be quite close to where the battery is to come into action. Artillery on the march, is near the head of the column, protected by cyclists as advanced guard, with cavalry patrols in advance, at the moment of contact it will have but a very short distance to go across country to reach its position. It is only necessary to indicate to the infantry commander where the artillery is to go; he will himself decide as to ways and means. If bicycling is impracticable the machine will be folded up and carried, or left on the ground, and without the loss of a minute, a zone of fire will be constituted in front of the artillery position. The few cavalrymen at disposal can meantime patrol and reconnoitre, as the result of which changes in dispositions may be necessary. But a hostile cavalry attacking would come under the fire of the escort.

The delicate moment is when the cavalry general makes his decision and communicates it to the O.C. R.A., who then makes his. It would seem at first as though the O.C. cyclists should also be present to do the same, and in fact this should be so. But if the rôle of the cyclists is merely that of escorting the artillery, its commander's decision should be made entirely subservient to that of the artillery commanders, even if the escort is not under the latter's orders. In a general way batteries will be much better protected by a cyclist com-

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pany than by cavalry. It is necessary, then, that large cavalry units should include a certain proportion of cyclist infantry, a part, at least, of which should be allotted as artillery escort, without prejudice to any other missions that may be given to it.

Artillery attached to a force of all arms.—Artillery in motion, either changing position or on the march.

In the first case, except in the exceptional circumstances when a battery moves by road into its new position, cyclist infantry is of no greater value than ordinary infantry. Mounted men can reconnoitre in front of the battery even if they cannot protect it; but any company of infantry with cavalry scouts can do the same.

In the second case, artillery must necessarily follow a road for the greater part of the way. The cyclist company can then generally accompany and protect the battery, conforming to its pace. It will obviously be less independent than a squadron of cavalry which can manœuvre around the enemy, leaving only a small body to guard the guns.

But if it is suitably scouted for by a few horsemen, and by artillery ground scouts, the cyclist company will always have time to take up a position to repel an attack.

It cannot protect the artillery against long range fire, and one or two lucky shots might cause great confusion. But if this happened with sufficient warning from the mounted scouts, the cyclists would always be able to interpose between the battery and the enemy. If, on the other hand, warning of the danger is conveyed in time, the cyclists will act in the same way as with cavalry; without binding themselves down to the dispositions of a regular escort, they will hasten to create a zone of fire in the enemy's direction.

Artillery in position not in the line of battle, ie., in the case of a detached battery on the flank of a force of all arms, and out of sight:—

The cyclist company, possessed of all the powers of an infantry company, will guarantee the protection of this battery under better conditions than could a squadron of cavalry, once the battery is in the position allotted to it. But while it is reaching this position? If it can be reached by road the cyclists will escort it as already described. If it is necessary to go across country, the cyclists may be able, by making a detour, to reach it by road; during which time of course they become impotent.

To sum up, companies of infantry cyclists perform the functions of escort under the same conditions as ordinary infantry. Nevertheless, being somewhat of a luxury, their missions should be limited to those which cannot be accomplished by ordinary infantry.

But cyclists on the road are infantry possessing a mobility superior even to cavalry.

It is quite suitable, therefore, to detail them as escort to a battery moving by road; at the end of the movement they must be entrusted with the protection of the battery, since no infantry unit is present to undertake the duties. The only precaution to be taken during the movement is that of providing them with means of seeing; the

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lack of this is the chief point of cyclists.

The question is more complicated if artillery moves, at least for part of the way, across country. Cyclists then lose most of their advantages. They do not become inferior to infantry, which cannot move more rapidly across country, nor use any stretches of road which fit in with the route of the artillery to better advantage. But they are distinctly inferior to cavalry.

At the conclusion of the movement, however, the security assured by the cyclist company is infinitely greater than could be afforded by a cavalry squadron; and in a country well intersected with roads it would be nearly always possible for the O.C. R.A. and O.C. escort to combine their movements according to the exigencies of the situation; taking into account that, at the worst, artillery could always for the time being proceed at a walk and so allow the infantry to keep up whilst going across country. It, therefore, seems reasonable to assume that cyclists can furnish a sufficient escort to artillery on the move, at all events equal to that furnished by cavalry. In rapid movements across country cavalry only can suffice.

But it is with artillery attached to cavalry units that cyclist infantry units can render the most valuable services. Cavalry may be given distant missions, preceded necessarily by long marches by road. Infantry cyclists can themselves conform to these rapid movements and furnish light and powerful advanced guards, thus releasing the offensive power of cavalry and at the same time ensuring greater security to its batteries.

The cyclist unit allotted to the cavalry is necessarily used in the advanced guard, the O.C. cavalry marching with this latter will thus have by his side the O.C. R.A. and O.C. cyclists, and the three can collaborate as occasion demands.

Unless the cyclists are specially told off to any other duty they will, as a matter of course, act as artillery escort, and interpose between the guns and the enemy.

Should, however, they be required for special purposes the duty of protecting the artillery will devolve upon the portion of the cyclists not so employed; forty rifles at least should in all cases be left at the disposal of the artillery. The whole should form an impenetrable barrier, behind which the cavalry may reform in case of reverse.

Finally cyclist infantry will shew to the greatest advantages in fighting a rear-guard action; an action particularly dangerous to infantry, so that the fastest moving arms are almost exclusively utilised for this. A minimum only of infantry is allotted in order to protect our batteries; each time the position is changed there is always a risk of losing a certain proportion of the infantry which cannot be withdrawn in time, or is outflanked, and comes under the merciless fire of the hostile artillery.

With a cyclist escort all this is changed, small sections can melt away and disappear almost instantaneously and can long maintain their mission as escort to the guns, allowing the artillery to remain until the very last and, in its turn, to disappear, leaving nothing in the enemy's hands; but of course they are bound down by the means of communication.

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To sum up from the point of view, a limited one it is true, of artillery escort, an increase of cyclist units is desirable, and also from other more important points of view.

Artillery considerably adds to the offensive power of cavalry. Cyclist infantry will still further increase this power, and at the same time ensure greater protection to the guns. Combination of the three arms allows each to act with a maximum of power. " Solidarity and blending of effort is the highest law."

Lieut. C. O. C. Hunt, R.A.

THE ARTILLERY DUEL.

Translated from "Artilleristische Monatshefte" for June, 1910.

The permanent allotment of any nature of gun to the field army ought to be on the supposition that the gun in question might play a useful part in any battle the army is likely to be engaged in.

Howitzers were introduced on the assumption that an infantry division required an additional gun, which, while less mobile than the field gun, should possess greater shell power and be capable of penetrating and destroying artificial cover.

The introduction of howitzers into the field army dates from the year 1896, and was not due to any particular war having demonstrated the inadequacy of the field gun, or the value of high angle guns in field operations. We must look back to the Russo-Turkish war of 1877 for an example of the advantages of the new introduction. The war of 1870 had brought those who took part in it to quite a different view. The German field artillery was armed with both light and heavy batteries, of which the former were mobile and the latter less mobile, though possessing greater shell power; but every battle demonstrated that in their tactical application practically no difference was recognised between the light and heavy batteries. When artillery was required, the nearest battery available was taken, without any consideration as to whether a light or heavy battery was best suited to the object in view.

In the re-armament which followed the war, however, one calibre only was kept to, and that the one which allowed of the greatest mobility. No one even suggested the introduction of a second nature of gun for penetrating behind cover or destroying works. The war did, however, give rise to one radical change and that was the separation of the field artillery from the guns of position (Fuss Artillerie).

The lessons of the Russo-Turkish war were cited as a reason for the allotment of howitzers to the field artillery, although this did not come about till nearly twenty years later. There is one lesson which stands out clear in every war, and that is, that there is a great tendency to overestimate the importance of improvements in actual weapons, while the secret of victory really lies in the moral soundness and stamina of the army.

The introduction of howitzer batteries into field artillery is not so much due to their need ever having been felt in any previous war,

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as to the fact that the gun had become more and more a flat trajectory weapon, which was of little value against targets behind even the most moderate cover. It is clear that against such targets the ordinary field gun will not have much effect, but it is to be doubted if this circumstance is of such importance as to warrant the introduction of another nature of gun. This is very questionable, even on the assumption that the battles of the future will take the form of attacks on regularly prepared positions, and that one of the combatants will act purely on the defensive from a more or less fortified position.

In the Russo-Japanese war this certainly was the case, but it does not follow that this will be the general rule under modern conditions.

The purely passive measures adopted by the Russians, to which the Japanese success was so largely attributable, are to be traced to the lack of enterprise of the commanders and the inherent defects of the army itself.

Although the Japanese did drive immense Russian forces out of their elaborately prepared positions, they did not achieve this by destroying the defences, or by making them untenable by artillery fire. They actually manœuvred the Russians out of their positions —in fact in every battle, what actually forced the Russians to abandon their positions, was not the vehemence of the Japanese attack, but the fact that their own flanks were turned. Neither the presence nor the absence of large calibre guns capable of destroying cover appears to have had any material effect on the result of combats against enemies behind artificial cover. Further, if it be assumed that the conditions then prevailing in the Russian army, which forced such a superior force to adopt purely defensive measures, are exceptional, it is also reasonable to suppose that fights for regular defended positions, in which alone howitzers can appear to full advantage, will also be exceptional.

It seems unsafe, therefore, to hamper an army with cumbrous and elaborate equipment for meeting cases which are admittedly exceptional.

In order to make full use of the numerous light and heavy howitzer batteries with which a German division is armed, it has been suggested that they should undertake the " traditional task of the artillery " by silencing the enemy's batteries, and then breaking in his defence, so as to assist their own attack. The field gun batteries on the other hand, have their own task allotted to them. Under exceptional circumstances, when no high angle fire guns are available, their work will have to be done by field guns.

This allotment of duties to the different batteries requires the light field howitzer well to the front on the line of march, if necessary with the advanced guard, and then the gun batteries, and in rear, behind the infantry, the heavy howitzers.

We draw attention to this proposal because it seems to revert to a procedure which was supposed to have been totally superceded as a result of the wars of 1866 and 1870, but which seems to have been to a certain extent revived in modern times, as a natural consequence of the improvements in every sort of military equipment.

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It is not only the entirely obsolete view about the "traditional rôle of the Artillery," *i. e.*, the artillery duel, which has to be disposed of, but also the idea as to the hard and fast, step by step, course of the fight, in which the several stages follow on, one after another, in regular succession. The only modern battle in which this set form can still be followed, is the planned attack on a regular fortified position, where the enemy's actual dispositions are known with some certainty, and a preconceived plan can be followed out.

Although the action taken by all arms should be dictated by the needs of the moment, and this applies more especially to the artillery, in this case, however, it is not its own requirements which have to be considered, but those of the arm it is co-operating with. This does not seem to indicate the silencing of the enemy's guns as the primary duty of the artillery.

The first care of the artillery will be the advanced guard. It is an unsound principle which teaches that the advanced guard, as soon as it has obtained contact with the enemy, has only to remain passive, while covering the advance of the main body, and that when the main body has come up it should fall in with the latter. This is undoubtedly one function of the advanced guard, but only when it has discharged its primary duty, that is the defeating or driving in of the enemy's advanced troops, until these receive reinforcements from their main body. This idea is expressed in the saying of Napoleon "On s'engage et puis on voit."

The advanced guard acting thus in a reconnoitring capacity obtains sufficient information for the commander to make his dispositions, and a premature deployment is avoided.

Under some circumstances the advanced guard will have to take the offensive in order to obtain possession of the ground it is to hold while covering the advance of the main body.

To attain this object the advanced guard obviously requires artillery, but it is immaterial whether the artillery should actually be part of the advanced guard, or whether it should follow at the head of the main body; it is not so much a large number of guns that is required, as a smaller number of very mobile batteries.

The first target will not as a rule be the enemy's artillery, which in all probability will not have come up, but the advanced infantry, who will either have to be checked in their advance or driven from positions necessary for our troops. Should hostile artillery appear at this stage, it will then depend entirely on how our infantry are faring, whether the artillery will have to continue firing without change of position at its original target, or turn its attention, either wholly or in part, to the enemy's guns.

This purpose can only be served by light field artillery, of sufficient mobility to conform to every requirement of the infantry, and for this reason high angle guns, of necessity less mobile, should never be far forward in a force.

It must be conceded that the fight may automatically develop into a combat between the artillery of both sides, but I think this will be the exception, not the rule, as it must be unsound to leave infantry, capable of inflicting damage on our troops, unmolested. But even

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when this does occur, it still is not the regular artillery duel, which, according to theory, should be carried on until the enemy's artillery is silenced. The silencing of the enemy's artillery is not an indispensable condition for the advance of infantry, for infantry can stand distant artillery fire far better than the effective fire of the infantry they are attacking.

The artillery has no *raison d'être* of its own, except that of assisting the infantry to bring about the deciding result, which remains unaltered from first to last in every battle.

If circumstances arise under which the artillery can best render the infantry this assistance by engaging the enemy's artillery, then it is obviously its duty to do so, but this should not be regarded as a regular opening phase of every battle, and it is for infantry and artillery commanders alike to remember that the bombardment of the hostile artillery is not nearly so fruitful of result as a thorough preparation, followed by effective co-operation in the infantry attack.

Artillery can be of far greater use to attacking infantry by keeping the defenders heads down, and, if possible, exhausting their powers of resistance by the time the infantry have got within effective range, than by merely lessening the effect of the hostile artillery fire, while leaving them to engage an unshaken defender without any support. It is far better for artillery even to expose themselves to the enemy's batteries, than that they should be unable to support the infantry attack at the decisive moment. From first to last the action of the artillery will be dictated by the immediate needs of the infantry, which entirely precludes their working on a preconceived scheme, but demands that they should be sufficiently mobile to conform to the infantry's movements.

It was this principle which guided the re-armament of the German field artillery in 1870, and has become of even more importance at the present day when infantry has to advance under the fire of such vastly improved weapons, and is, therefore, far more dependent on the support of artillery.

The opinion has been expressed in some quarters that the tendency to revive the old "Artillery Duel," and to devote any spare howitzer batteries to it, arises out of an uncertainty as to the proper rôle of howitzer baateries in field operations. Another cause which has contributed to this is the enormous increase of the artillery of the field army, and the addition of howitzer batteries, which has given the army corps and divisions more artillery than they require. It is found that the nine 6-gun batteries are more than enough for giving the infantry the necessary support, and a special rôle would thus seem to be indicated for the six howitzer batteries. It is, therefore, the super-abundance of available batteries which accounts for this tendency to revert to the old idea, and not the belief in the soundness of a course of action whose fallacy has been demonstrated by every experience of practical warfare.

It seems, therefore, quite clear that in all future wars, that commander will be victorious, who by rapid and decided action prevents the enemy from bringing his elaborate fighting equipment to bear, and it is equally certain that that side is doomed to failure, which

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works on the idea that modern improvements in equipment warrant any departure from old and unchanging tactical principles.

The precise capabilities of each weapon must be fully appreciated, before it can be used to full advantage, just as much as the nature of the ground of any position must be understood by the commander who will successfully fight on it, but changes and advances of materiel do not, any more than local peculiarities of country make any difference to old established principles.

A. C. B. Neate, Lieut., R.G.A.

Fire Control of Field Artillery.

Translated from the "Russian Artillery Journal," April, 1910.

At the present day there is a considerable difference of opinion among artillery officers as to the best method of fire control, when dealing with guns massed in brigades or divisions. This has been caused by the necessity in modern warfare of firing from masked or concealed positions against a similarly placed enemy. After examining the numerous suggestions as to the best way of dealing with this problem, we must confess that no suggestion yet set forward appears satisfactory in all cases.

In view of the urgent necessity of taking some action in the matter, orders have recently been issued for the supply of the Michael Ture director and plotter to the field artillery. It must be admitted, however, that the addition of these instruments to the equipment of a battery cannot finally settle the question of fire control, because, in spite of all their qualities, they do not fully satisfy all the demands, which the conditions of modern warfare are likely to make on them.

It is worthy of notice that the Artillery Committee, even after the most strenuous exertions of the last three years, has not been able to lay down any hard and fast rule for controlling the fire of an artillery brigade in war, and battery commanders, who turn to them in the hope of finding a solution of this much discussed question, will, I am afraid, be disappointed.

This being the case, it remains for battery commanders to evolve some scheme of their own and, in doing this, the following notes may be of assistance.

For the automatic solution of triangles by such instruments as the director and plotter lately issued to the field artillery the following must first be found:—

1. Battery angle.
2. The distance from the observing station to the battery called the base.
3. The range from the observing station to the target.

If the battery cannot be seen from the observing station, the direction of the battery must be taken by compass bearing and the base guessed.

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The accuracy of the solution of the triangle depends on the accuracy with which the above three points are measured.

In the battles of the present day, and still more so in those of the future, it will be necessary to split up brigades and use the artillery as dispersed batteries. The advantages of so doing are obvious to all and will only be briefly referred to here.

They are:—

1. A greater choice of positions is offered to a single battery than to a brigade.

2. Dispersed batteries can better adapt themselves to the formation of the ground, and, therefore, can take better advantage of cover.

3. The losses from hostile fire are decreased.

4. The chances of bringing oblique and enfilade fire to bear on the enemy are greatly increased.

5. Batteries can render each other better support.

6. Greater freedom in changing positions.

7. Better support can be afforded to other arms.

The dispersion of batteries is only possible (1) when a perfect system of communication exists between the batteries and the brigade commander. (2) provided there exists some means of quickly and accurately switching the fire of distant batteries on to the vital points of attack.

Our present methods of communication are field telegraphs, telephones, and semaphore signalling. In the near future it is to be hoped that wireless telephony will still further facilitate matters.

A brigade commander must always keep his batteries under his own control, and must be able to concentrate the fire of all the guns wherever and whenever he wishes to do so. At present he can only do this by means of director angles and "squared maps." Neither of these methods are wholly successful, and it is the wish and object of the Artillery Committee to evolve some better plan.

The more one considers this problem, the more one recognises the importance of a good observing station for the brigade commander.

Under modern conditions of warfare, the opening phases of a battle will consist in the reconnaissance and selection of good observing stations and in the attempt to deny the same to the enemy.

The importance of this primary selection of observing stations cannot be overrated, because a subsequent change of position is often impossible owing to the impracticability of reeling up and relaying the telephonic communications. As the battle progresses the brigade commander must send forward assistant observers, if necessary right up to the firing line, and these observers must be able to communicate by telephone direct to the brigade commander the position of fresh targets or changes in the tactical situation invisible to the troops in rear.

J. K. L. Fitzwilliams, Lieut., R.F.A.

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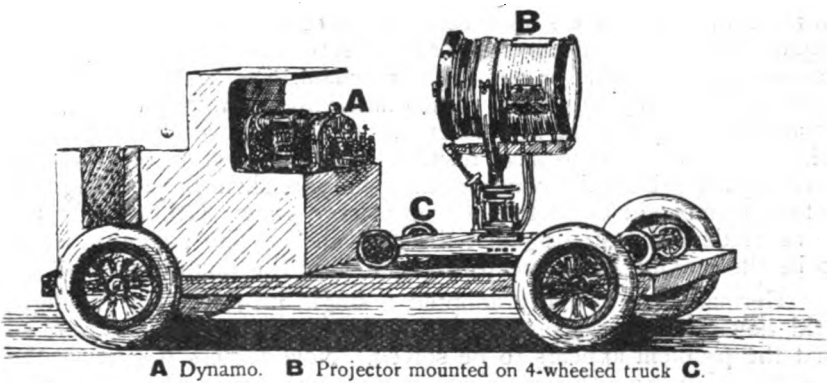
The New French Army Searchlight.

The French have recently adopted an automobile searchlight designed by Major Cordier of the French Engineers.



A Dynamo. **B** Projector mounted on 4-wheeled truck **C**.

The motor car, which is shown in the attached sketch, has a de Dion Bouton chassis of 18 H.P., capable of travelling 20 miles an hour, and geared low for work off the road. It is capable of mounting an incline of 15 degrees. The car engine drives the dynamo which provides the electric light. The projector, which is 36 inches in diameter, is carried on the car, but is not intended to be used on the car except on emergency, as the vibration of the engine interferes with the carbons. It is, therefore, fixed on a four-wheeled truck, which can be dismounted down the front of the car on trough skids. The stem of the projector is made telescopic, so that the barrel can be lowered right down on to the truck for travelling.

The car carries 165 yards of cable to connect it to the projector, so that the car and engine can be kept under cover.

The remarkable feature of the projector is the electric control gear. It is elevated, depressed, and traversed by small electric motors, which are controlled from a point 220 yards distant. The observing officer has a switchboard connected with the projector by a cable of several separate strands, and by turning the keys he can direct the light as he pleases, and can open and close the shutters of the projector.

The electric control gear is made by Messrs. Breguet of Paris, and is said to have been adopted in the Belgian Army.

H. A. Bethell, Bt.-Colonel, R.F.A.

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Single Nature Shell.

Translated from "Revue Militaire Suisse," June, 1910.

Austro-Hungary.—Attempts have been made to introduce for field artillery a projectile of a single nature. The solution of the problem is to be found in the use of a double fuze which can be set so as to bring about a slower combustion of the charge or an initial explosion of great violence, according as to whether the shell is to be used as a shrapnel or not. The mechanism is based on the property possessed by explosives to detonate only when they are suddenly and violently set on fire, otherwise they burn without explosion. These trials are said to have resulted in the production of a type of shell replacing both the common, and shrapnel shell, but experiments with it cannot yet be carried out on a large scale. Other marks are to be made and tested against this first shell. The difficulty seems to be the making of a fuze which will serve the double purpose.

Germany has recently adopted a single projectile for the light field howitzers, the design of which fuze answers all purposes, so that the problem appears to be solved. Nevertheless it is none the less true that manufacture of this fuze bristles with difficulties and complications, and the results so far obtained are not eminently satisfactory.

C. O. C. Hunt, Lieut., R.A.

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"TECHNOLOGICAL DICTIONARY."

English—Spanish—German—French.

By Carlos Huelin y Arssu, Major, Spanish Artillery. (Madrid: Adrian Romo, 5 Alcalá. Price 15 pesetas per volume).

The above named work, which is to be in four volumes, one being devoted to each of the four languages dealt with, is now complete all but one volume (the French), and, thanks to the kindness of the talented author, who has presented the R.A. Institution with a copy of each volume as it appeared, we have now at our disposal the most modern technical dictionary available.

The first volume, the English, was brought out in January, 1906, and was briefly noticed and acknowledged in the Journal R.A. Institution, of February, 1906. This was followed in 1908 by the German, and in 1910 by the Spanish volume.

The time seems now to have arrived when a brief notice of the scope and nature of the work should be acceptable.

The labour of compiling such a book as this must be colossal, and the greatest credit is due to the author, not only for the ability and versatility exhibited in the production of a *magnum opus* such as this undoubtedly is, but that he should have been able to carry on the work in spite of the serious interruptions caused by his being employed on active service in Morocco during the past three years.

Major Huelin is by descent and education partly English, and is, therefore, specially competent for that part of his work which is most important to us. He has been a professor at the Artillery College at Segovia, and for the past five years has been in command of a mountain battery.

In the preface to each volume, the author draws attention to the fact that although there have been a number of technological dictionaries published from time to time, there are very few in which the Spanish language is properly represented; and, as a rule, the best technical dictionaries which deal with Spanish are only connected with one other language; *e. g.*, Ponce de Leon's and Cañada's English-Spanish technological dictionaries, &c.

Major Huelin's dictionary has the great advantage that it can be used for any of the four languages, and cannot fail to be of great service to the student of foreign military, naval, and technical literature, as well as to translators.

Owing to the constant progress made in naval and military science, and consequent on the development of electrical knowledge and appliances, explosives and mechanism of all kinds, &c., &c., the mass of new technical terms becomes bewildering, and it is only by a work such as this which we are reviewing that the student of

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technical literature can consult the best authorities in various languages. It unfortunately takes but a few years for a dictionary of this kind to become obsolete or, at all events, not up-to-date, and we must, therefore, hope that the author may be able, either by periodical addenda, or by a revised edition in the early future, to keep it on a level with the times.

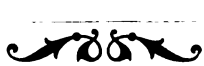
Each volume bears a list of the works consulted, which are numerous, and represent practically all the best literature on the subject. But there must have been thousands of words which the author had to puzzle out for himself, and one cannot but admire his immense industry and erudition.

It would be impossible in a work of this kind to avoid errors of orthography and the introduction of words which, if they exist, are not generally familiar; but, taken as a whole, the work seems comprehensive and understandable; genders are given and notes explaining whether the term is nautical, military, architectural, mathematical, &c. A long list of abbreviations figures at the commencement of each volume, and the printing and arrangement of the translated words are clear and good; the author is careful to explain that the work is not a dictionary of definitions, but one of equivalents.

A dictionary is not an easy subject for review or criticism; it must speak for itself when used, and it is chiefly by the student who uses it that errors or omissions are noticed. These are bound to occur at times, and if we could by any means collect on slips of paper the remarks of those who, when using the work, detect errors, &c., in any of the languages concerned, I would be very glad to collate them and send them from time to time to the author, who would, I know, be grateful for such assistance.

We can now only offer our congratulations to Major Huelin on the marvellous industry he has displayed, and hope that it will not be long before he is able to produce the remaining volume to complete the set, which will be a lasting monument to his application, linguistic attainments, and energy, and we also wish him the more substantial success which his labour so thoroughly deserves.—*J.C.D.*

NOTE.—Should any Member who notes errors in this work care to send the Secretary R.A.I. a note of them he will forward them to General Dalton in the manner suggested above.—*Secretary R.A.I.*



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To what extent can Infantry rely on Artillery to support its attack?

Translated from "Le Spectateur Militaire."

15th July, 1910.

France leads the way in engines of destruction, improvement in which aids the attack.

Rapidity of fire and improved methods of laying may make the enemy's position untenable, while artillery, under cover of their shields, can still achieve good results under hostile fire.

The function of artillery is to crush the opposing infantry, to remove obstacles to our own infantry's advance, and to silence the hostile guns. The artillery duel and the infantry attack are now practically simultaneous. The artillery should select living objectives whenever possible.

In modern times guns accompany battalions and regiments as in the days of Gustavus Adolphus and Frederick up to the actual launching of the attack. In the armies of the Revolution and Empire batteries were rapidly massed to crush the living target and infantry the Queen of battles became food for powder.

At Rivoli Bonaparte destroyed the Austrian column; at Austerlitz, Friedland and Wagram the hostile infantry is shattered by a hail of projectiles. These and other examples prove that the effective attack of living objectives by artillery is no new idea.

Modern armies have recognised the importance of first obtaining superiority of fire, but abuse the idea by thinking that infantry could not take risks at effective range, unless the opposing artillery was reduced to silence.

What was done away with in principle in the days of Gustavus, Frederick and Napoleon, should have made those critics more careful, who at the end of the 19th Century declared the annihilation of the enemy's guns indispensable, and this gave an exaggerated importance to the result of the artillery duel. The arm most interested, who were thus able to act independently offered no objection to this principle. If the Japanese had waited for the destruction of the Russian artillery before launching their attacks, the Russo-Japanese war would still be going on! Modern field artillery is highly mobile, can only be temporarily silenced and can decline combat if over-matched.

Infantry officers, after attending an artillery course, usually return full of enthusiasm and confidence in the prowess of the auxiliary arm.

We infantry, with every belief in our artillery up to a certain point, want to be assured of their support to the very end. We are the arm to suffer the greatest losses and carry the enemy's positions. The artillery practice camp results can only help us to form an opinion, and are like laboratory experiments as compared to actual industrial experiences. At practice camp there is no enemy, no confusion, no neighbouring troops, while everything is carried out with preconceived ideas.

It is absolutely wrong to base tactical rules on practice camp results. There cut up, woody, mountainous country is not represented, and when these conditions really exist, we have only the experiences gained in normal country to guide us.

Far be it from me to suggest that practice camp results should be ignored; one must make a mental transformation of these conditions to the stern realities of modern warfare.

In this study we must imagine lines of men extended at great distances, with units of infantry and cavalry mixed up, where they can only act in their allotted zone. The artillery will here have often to fire over the heads of their infantry. The latter will attempt to gain superiority of fire by having as strong a firing line as possible, and will advance by alternate rushes, in échelon if necessary, ready to entrench, and constantly reinforced by supports. This continues till the infantry arrives at the enemy's position. The chief targets for the artillery is the first line of the defenders. When our infantry arrives from 300 to 500 yards from the position, the artillery must for safety increase their elevation and engage the enemy's supports and reserves. Now the enemy's firing line will raise their heads, and pour fire on the attackers. The support of the artillery has now reached its limit.

Artillery support is less necessary when the infantry can advance under cover. The defender also will conceal himself if possible, to prevent the artillery taking part in the action.

In bad ground however and in places where the enemy's dispositions are hidden, one is apt to assign to artillery too important a rôle.

It may be observed that even then artillery ought to fire, to encourage the

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infantry. This leads to waste of ammunition and must be given up. In the artillery duel, the temptation to constantly change target must be resisted. The existence of gun-pits will now be an important factor, especially if the guns can fire with flashes invisible. Some units will probably be put out of action, and some guns must be detailed to prevent their reopening fire. An essential point is that the commander must tell off "infantry" batteries. When these batteries are firing, all other artillery action is subordinate to them, on the one side to support, on the other to harass them. The object assigned to the infantry is after all the common object, and the efforts of all must be concentrated to one supreme result.

1st August, 1910.

The following are the principal points with regard to "Infantry batteries:—

1. They will be protected by counter-batteries, who will try to draw fire on themselves and will often have to come into action in the open. Others will be in readiness to snap up hostile batteries as they come up.

2. In spite of their mobility, counter-batteries can only exercise an indirect influence more or less useful with regard to the infantry batteries, rather than a really protective influence, especially if the latter are in the open, firing with flashes visible, or crossing a dangerous zone.

In these cases the enemy's batteries if completely hidden can annihilate the infantry batteries. The best way to protect infantry batteries is to completely conceal them. This nature of fire simplifies the task of the personnel, as the layer does not have to pick up and keep on the target. The battery once ranged, its commander can control the fire by a simple code of signals. The lowest range at which the trajectory will clear the crest must be found, and the angles of sight of possible targets and dangerous crests.

General Rohne is less optimistic about batteries under cover. He considers the indirect system unsuitable for a great battle.

3. The third way to ensure the efficiency of infantry batteries is to provide them with flank cover against the enemy's guns in action, the cover not being in a suitable position to protect them from the target pointed out.

4. In this case the batteries have in front of them cover to conceal a man on foot, and flank cover which hides flashes from the enemy.

5. This system is to scatter the guns, but can only be resorted to as a "pis aller."

The difficulties of infantry batteries are:—

(a). Danger of changing position.

(b). They must sometimes be in the open.

(c). Danger of accompanying infantry under fire.

(d). Difficulty of keeping up communication with the infantry.

(a). The batteries must not remain at long range, but get to closer quarters. They must advance by covered roads, previously reconnoitred with great care. The advance must if necessary be by single guns. Before reaching the new position they should unlimber and run up by hand.—No more gallery advances into action! Every false move will be visited by punishment and perhaps annihilation.

(b). Sometimes necessary to achieve the tactical aim and is recommended by General Rohne, and other German authorities. Reicheman declares that indirect fire deprives artillery of its offensive spirit. Infantry and cavalry must march in the open. If the guns hide, the Infantry has to bear the brunt of the battle.

General Blume is of opinion that artillery under cover can act effectively against visible targets and those of which one knows the exact position and range. They will be hard for the enemy to locate without balloons. But in the advance during the fight artillery must give up their hidden positions and choose positions only partly hidden or in the open. By this means they will draw the enemy's fire on to themselves and will relieve the shieldless infantry from hostile infantry fire.

According to German tacticians the existence of shields and gun-pits will justify artillery acting with the greatest boldness. Only lucky rounds of percussion shell will injure them. Perhaps the artillery duel will have no definite result at all. General Langlois says that a projectile such as a "pom-pom" shell, to have effect behind the shield, should be introduced.

The regulations prescribe that artillery must support infantry by being quite close to it, and they recommend "accompanying" batteries.

Infantry anyhow should have the moral advantage of hearing the noise of the guns or the sound of the wheels.

General Dragomiroff lays stress on the comaraderie of the two arms, and says to the infantry "It is for your sake that the artillery makes breaches in living walls; she forces the way, works for you and herself." To the artillery, "You must take up the most dangerous and exposed positions every time that the destruction of the enemy depend upon it. Do not be afraid to lose guns! He alone loses them who sticks to his post and sacrifices himself for the infantry. Your ammunition exhausted, your guns dismounted your gunners killed, still stick to it though you can no longer fire, you alone know the reason."

General Dragomiroff would probably have modified his opinions had he lived to see the Russo-Japanese war. In Germany General Rohne says that a fraction of the artillery, during the assault, accompanies the infantry, but the principal part retains its position and continues with crossing fire. They should be on

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the flank if possible, but good flank positions are rare, and if the flank batteries are heavily shelled by the enemy, the infantry can no more rely on their support than on that afforded by the batteries which actually accompany them.

The regulations of 1907, prescribe that some batteries must be told off to advance to the conquered position as soon as possible after the victorious infantry, in order to punish the retiring enemy, a very delicate and dangerous manœuvre.

These batteries will probably be on the flank, and must advance under cover, gun by gun if necessary. They will be exposed to infantry fire and run the risk of heavy losses in horses. If the enemy counter-attacks, these batteries will be in a sorry plight; they must entrench where they are, maintaining a desperate fire, or retire rapidly.

The question is can they risk arriving at the position under fire and being swept away by counter-attacks? Under these trying circumstances will they be in condition to help the infantry? If the infantry have not really occupied the position as supposed, the artillery will run the risk of selling the bear's skin before it is slain. Will the game be worth the candle?

15th August, 1910.

Difficulties of co-operation between the two arms.

General Percin lays stress on the importance of communication through the commanders as well as direct communication between units.

Formerly the short range of fire-arms prevented the defender from detaching to a distance part of his forces. The attacking force approached the enemy's lines almost at once, the latter being very visible owing to the smoke, and the attack developed in thick, extremely visible lines. The attack lasted but a short time, and visual communication was very easy.

While it is easy for artillery to follow infantry movements in open country, the battlefield of the future will appear denuded of troops, and the scattered formations of infantry, and their desire to obtain cover will render it difficult for artillery to keep in touch with them.

In close country visual communication is impossible, and battery commanders can only see the object of attack. To be certain of affording adequate support to the infantry, the artillery must fire ceaselessly, at a rate beyond the powers of any system of ammunition supply.

It will therefore be more prudent, economical, and simple to thoroughly familiarise artillery with the art of co-operation. As the artilleryman cannot both watch the target and also know the exact moment to fire, he must use special observers who will accompany the infantry scouts and reconnaissances.

General Percin recommends an artillery officer going with the infantry, who can signal in the following different ways:—

1. Telephone, which however is unreliable.
2. Visual signalling or small captive balloons which one shakes like the telegraphic code.
3. Flags as used by the Japanese to warn artillery to increase elevation when a position is captured.
4. A code of signals which are easily mistaken and are difficult to arrange between the two arms.
5. A helmet fixed on a rifle, which is unsuited to long ranges.
6. A chain of signallers and orderlies, the line to be lighted up at night.
7. Written orders to be carried by orderlies. This is difficult on account of the different aspect of the ground from different points of view. One must then use very carefully defined marks or sketches in perspective. Orderlies may be killed en route, and this mode of transmission is too slow and risky. All methods must be tried and two units used to working together and convinced of the necessity of co-operation will soon find out for themselves the best way to carry it out.

General Percin recognises that co-operation must be slow, and that the attacking infanty may however have to suspend their movements. This may destroy the infantry's initiative and injure their offensive spirit, and the favourable moment for attack may pass by. The incalculable advantages of a surprise might thus be nullified, and infantry must seize its sometimes fleeting opportunities without waiting for artillery support. Frequently however at manœuvres one hears it said "we have not heard your guns, you attacked without support." It has happened at manœuvres that the front infantry line have found the enemy at a disadvantge and have driven home their attack without waiting for their artillery or reserves. This proceeding was criticised, probably on account of its not being carried out by the recognised method.

Limit of co-operation.

All information to be sent is divided into two parts:—

1. What is under our own influence.
2. What may be affected by the enemy's dispositions.

1. To fix the right moment to commence or cease fire, to point out the target to the artillery, and prevent it firing on its own infantry will all depend on ourselves.

2. The positions of villages, woods, earthworks &c., which are the points d'appui of the enemy's position can be indicated by one of the methods of signalling mentioned above.

However it must not always be taken for granted that one particular part of the village or wood constitutes the key of the position. For instance one must not direct all one's efforts against a particular building which has been fortified by the enemy. The latter will defend all the possible points of attack.

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The infantry comander cannot say with certainty that the fire which harasses him proceeds entirely from *one* house, *one* salient or one flank. The enemy's points d'appui cannot be sub-divided with such minuteness.

The spirit of co-operation must be conceived in a broader spirit, and the artillery must often fire on every part of a point d'appui, rather than on each part in succession.

Supposing infantry held up by a special part of the defensive line, unseen by the artillery, the latter may engage and annihilate the enemy by the description given of the obstacle.

It is a question however whether in real warfare orderlies and scouts can approach near enough to the enemy to give such an exact description.

The minute reconnaissance of the enemy's position and the standardizing of systems of communication are matters of pure theory and are only suited to practice ground conditions. In war it is very often all one can do to avoid firing on one's own troops, and one can only get a very general idea of the enemy's movements.

It is fatal, in the pursuit of an unattainable precision of communication, to let slip tactical opportunities. Artillery must not rely on receiving information such as they obtain at practice camp.

We fell into the same mistake with cavalry, in asking them to furnish too minute information about the enemy. As regards communication between infantry and artillery one must avoid falling into the same mistake of being too exacting in demanding information.

(To be continued).

Edward P. Smith, Major, R.F.A.

Russian Artillery Tactics.

Translated from "Artilleristische Monatshefte" No. 41, of 1910.

The Russian artillery were handicapped at the commencement of the recent war through an insufficient knowledge of their new equipments, while their somewhat obsolete drill books had not been brought up-to-date.

Although their field service regulations laid down that commanders should at all times and in every field operation try to take the offensive, yet this injunction was for the most part disregarded. The principle of bringing as many guns as possible into the firing line was not compatible with keeping a large artillery reserve.

Occupying open positions and advancing to decisive ranges in face of the enemy's shrapnel fire was found impracticable. Firing over friendly troops which was only permitted under exceptional circumstances was found to be absolutely necessary if the infantry were not to be left without any support.[1]

The construction of artificial cover in defensive positions was discountenanced on the ground that the freedom of action of the defenders was thereby restricted.

The precepts of General Langlois were blindly followed without regard to the fact that the French regulations were framed specially for shielded guns, and further, that General Langlois pronounces strongly in favor of the support of infantry by the sister arm. This support was certainly not given during the war. Langlois is also in favor of covered positions subject only to the battery commander being able to direct the fire and simultaneously observe its effect. It appears, in short, that the teachings of Langlois were obeyed in the letter, without their underlying spirit being in any way understood. The net result of the combination of the French idea of the allotment of separate tasks to individual units, and the Russian belief in a large reserve was that a decided superiority of artillery fire was never really reached.

In disobedience to the French teachings, covered positions were rejected in favor of open ones. The divergent views of Generals commanding and artillery commanders on this subject gave rise to a certain amount of friction.

The Russian artillery acted almost entirely on the defensive, and their tactics were chiefly distinguished by free use of long range and searching fire, and the massing of batteries in concealed positions.

General Irvanoro who commanded the Vth army corps has made some critical observations. He is of opinion that the artillery and infantry should always work in the closest combination and in opposition to the Russian preference for covered positions, is in favor of open positions. Batteries should, he urges, be told off specially to the duty of following up the infantry attack. More training is

[1] According to the Russian regulations, firing over friendly troops was only permitted on the personal responsibility of the battery commander in question, and only if there was absolutely no danger either of injury or of their being alarmed by the shell passing over their heads.

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necessary in night work, especially in the occupation of positions, laying out lines of fire, and fighting by searchlights.

General Dashkow, who has recently published a work on field training, has made some exhaustive comments of which the following is an extract:—

The principal duty of the artillery in the attack consists in paving the way for the infantry advance, by breaking down any resistance offered to it, and in the defence the main object is to impede the advance of the hostile infantry, by destroying anything that may be of use to them.

To bring about any decisive result, the artillery must be used to full advantage, which requires a thorough knowledge of the nature of the ground (which can only be obtained after careful reconnaissance) and judicious conduct of fire.

The occupation of positions in the open should only be resorted to under the following exceptional circumstances: (i). When no covered positions are available. (ii). When the enemy is so weak in artillery that he could not engage our artillery with any hope of success. (iii). When our troops require immediate support. (iv). In a pursuit.

When artillery have to remain for long together in the open it is absolutely essential that they should be dug in or concealed by some artificial means. The object of masking guns is to render the ground in the neighbourhood of the battery difficult for observing fire, and this is best done by constructing screens some 300 or 400 yards in front of the position.

The best form of gun pit is a deep pit, without parapet, and with holes each side for the detachments. The holes should be deep enough to completely conceal a man.

A depth of from 2 to 4 metres below the enemy's line of sight to the crest is sufficient to conceal the actual guns from view, but this depth requires considerably increasing to entirely conceal the flashes.

Batteries which may be called upon to fire over a wide front must be placed at intervals of at least 60 paces, to allow of their switching to 40—45 degrees from their original line of fire, without danger to their neighbours.

In order to minimise the effect of the enemy's fire, the interval between batteries should never fall below 25 yards.

The question of ammunition supply has increased very much in importance, owing to the rapid rate of fire which can be maintained by the modern field gun. Merely bringing up ammunition by hand in the open is absolutely out of the question. In cases where no covered approaches to positions exist, ammunition depôts will have to be formed and connected to the guns by covered communication trenches.

For the actual occupation of the position it is not possible to frame any binding regulations, save only that in every case commanders should adopt the method involving the least loss. The set forms prescribed in the past are not practicable under modern conditions and are therefore forbidden at peace manœuvres.

Our own infantry can be fired over, if they are more than 600 yards from the guns, or 500 from the target. This latter condition necessitates the guns ceasing fire at the very moment when their help is most needed. Positions on the flank should be available, from which the front line can be supported at the critical moments.

Entrenched batteries should have alternative positions for use in case the enemy should succeed in getting ranged on to them and also to deceive the enemy as to the real position. Colonel Novikow considers that guns on the reverse slopes of hills, should be so far behind the crest, that the enemy cannot get ranged on to them without searching fire, involving a very large expenditure of ammunition. He thinks for this purpose they should be 400 yards behind, and should also be provided with an increased staff of signallers and telephonists for the increased difficulties of transmitting orders.

One unavoidable result of the employment of under cover positions is that there will always be a certain amount of dead ground in front of the batteries. This disadvantage can be compensated for either (1) by dividing up the dead ground among other batteries to a flank, which can fire on the dead ground at short ranges, or (2) by detailing batteries to the special duty of looking after the forward slopes of positions, where dead ground usually is.

The latter method is the best, and is specially advantageous, if the guns can be so located as to bring flanking fire to bear on the dead ground. The experiences of the late war show that machine and mountain guns are specially applicable to this purpose. Such guns would be placed, if possible, behind artificial cover, on the forward slopes, and in the event of the main attack being repulsed, would move forward and engage the enemy with rapid fire.

Detached Sections:—

It is sometimes advantageous to use detached sections in a reconnoitring capacity, i.e. to gain touch with the enemy, and induce him to give away his positions by opening fire. These "reconnoitring sections," should be capable of rapidly changing position, as they are of necessity too weak to maintain any protracted resistance of their own.

It is of prime importance to the attainment of decisive resulas, that the allotment of targets to the artillery should be in accordance with the general scheme, and not part of any separate scheme for the artillery, and secondly that the various batteries and brigades should be allotted targets which the nature of the ground and the tactical situation admits of them engaging with most success, and thirdly that the fire of a large number of batteries should be able to be switched at the shortest notice on to any part of the enemy's position.

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These points demand, first of all, the conduct of fire of the whole of the artillery being vested in one officer, and secondly that the whole hostile front, and its foreground should be thoroughly reconnoitred, and lastly that there should be a reliable system of communication between all commanders, especially between artillery commanders among themselves and between them and other arms.

The General commanding the force should indicate to the artillery commanders their tasks, with as much precision as possible and should couple his orders with an explanation of the general idea, and of the immediate object in view, but the artillery commander should be left full latitude as to how these tasks are to be carried out. He should personally supervise the reconnaissance of his own and the enemy's position: he should divide the position into sections, and allot to each section its general task. In doing this he should endeavour to fall in with the suggestions of the commanders of sections.

As it is obviously impossible for the artillery commander to follow the course of the fight from every part of the artillery position, and circumstances may frequently arise which necessitate immediate co-operation with adjacent units, it is the duty of subordinate artillery commanders to carry out this co-operation on their own authority. They must however immediately report such action, and when the occasion has passed, should return to their original targets. Apart from these exceptional cases, any change of target should be made solely on the authority of the artillery commander.

The long range of quick firing artillery admits of the concentration on any part of the enemy's position not only of the guns immediately opposite to it, but of those up to two miles to a flank. If such a concentrated fire from a large number of batteries be brought to bear on single batteries in turn and the remaining batteries available be kept engaging the whole line, the fire of the most active batteries will be sensibly weakened, if not altogether silenced, and the power of the whole opposing artillery will be materially lessened.

If after such an attack the enemy's artillery should cease firing, it should not be taken for granted that they are out of action, but they should be kept under the closest observation.

The principal duty of the artillery in the attack is the support of the infantry; at the commencement of the fight the sections in observation seek to draw the enemy's fire.[1]

The bulk of the artillery should then be turned on to the point where the attack is to be pushed home, a few batteries only being still employed in keeping the enemy's artillerymen engaged. Guns should not as a rule change position until a decided superiority of fire has been obtained. When the infantry has reached to within 400 yards of the enemy's position, the artillery should seek, by firing at increased elevations to hinder the bringing up of reserves.

The Russian artillery, throughout the war, showed a preference for firing at long ranges. This arose partly from the peculiar nature of the country, and partly out of a desire to keep the Japanese at a distance by the greater range of their own shrapnel fire. Changes of position in action were very seldom practicable.

The stubborn defence of the Russian positions at the Sha-ho, and at Mukden, have given rise to a general feeling in favor of taking up a succession of lines of defence, one behind the other, so then, in the case of the enemy penetrating the front line, the second or third lines may still be able to repulse him.

A position defended in this way is particularly safe against night attacks or any form of surprise. The position is divided into the front line, consisting of infantry trenches and gun emplacements, a second line, and rallying positions.

Take the case, for instance, of a position defended in this way by an Army Corps. Here there would be a forward position for the advanced guard, and behind that two or four sections at intervals of about 700—2000 yards, each defended by one to four battalions and one or more batteries, and a number of machine guns. This would be the main position; an Army Corps therefore would occupy a front of about 8000 yards.

Each of the sections is divided again into front and rear lines.

If the advanced position is intended to deceive the enemy, it should be vacated before he gets within effective range.

The main defended position consists of infantry trenches, with numerous recesses to the rear, in which the troops can shelter until the infantry battle begins.

Colonel Golenkin advocates the formation of enclosed circular trenches at intervals along the line, as specially strengthened points. If one of these gets captured, the attackers will be taken in flank by those on either side, and these form, with the second line, a somewhat crooked but still unbroken line of defence.

It is very difficult for the attackers to distinguish the actual main position, from the maze of false fronts, supports, and cover, and communication trenches which such a defence presents.

Colonel Novikow is of opinion that the space in front of the crest, which only comes under rifle fire, when guns are under cover, should be covered by the

[1] Colonel Norvikow relates that the Japanese succeeded on several occasions in forcing the Russians to disclose their position, by detaching sections of mountain artillery to the front, which presented a small target and disappeared as soon as fired on. Other guns were then ready to turn on to the batteries thus disclosed.

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fire of machine guns and detached sections of mountain artillery. These machine and mountain guns should be kept concealed until the critical moment. It was largely due to such guns that the attack at Lyan-Oljasom was repulsed.

On the flanks of the gun positions the detached advanced posts (Erkundungszuge), should draw the enemy's fire, and endeavour to induce him to betray his positions. The Japanese artillery usually opened fire from these posts, which as a rule consisted of mountain guns.

The tendency to look upon the defence of any position as the final end and object, and to be able to bring every patch of ground under frontal and flanking fire, to have a precise course of action to meet every possible contingency leads to a purely passive form of defence, which only seeks to repulse attack, and, in the face of an active and energetic enemy, will lead to certain failure.

General Woronzow — Daschkow holds that the distant and long range fire of attacking artillery should not be returned at all by defenders, or if returned, only by guns or sections detached to a considerable distance from the main position. This would mislead the attacker without betraying the position of the defenders artillery.

From these isolated expressions of opinion by Russian authorities, it appears that the Russian artillery tactics of the future will be solely based on the experiences of the late war.

"We alone have practical experience" they say, "we can disregard the theorizings of Western Europe we are for the future to set the fashions, other nations shall take the cue from us."

A. C. B. Neate, Lieut. R.G.A.

Employment of Field Artillery with Small Detachments.

Translated from "Rivista di Artigleria e Genio," of April, 1910.

In war, the employment of small detachments is common, in peace manœuvres they are usually abused. In great campaigns, which involve the movement and collision of large masses, there are also included minor operations of no less importance, intended either to prepare the way for the main bodies or to injure the enemy in some manner by threatening or disturbing the complicated transport of supply and the clearance of his communications.

History offers many examples in this respect, corresponding in importance to the magnitude of the campaigns, as judged either by the number of combatants or by the duration of hostilities or by the size of the theatre of operations (e.g. the wars of Frederic the Great, or of Napoleon, or that of 1870).

The student of minor operations is very rare at the present time, especially in Italy, so much so that we are forced to believe that such operations are large campaigns on a reduced scale, and subject to the same rules. This is a mistake. War on a large scale is the action of masses, slow, heavy, and combining art and science. Minor operations are a question of speed, prompt, mobile, and essentially an art of itself. Too often we see, in ordinary exercises, a painful effort directed and commanded as though engagements between small detachments were developed on the stereotyped model of great battles.

This is a dangerous habit. We model clay with a modelling tool, but to sculpture marble a whetted chisle is necessary. The modelling tool and the chisle are, in our opinion, the detachment and the large unit, the work in marble is the battle. And it is a pity that we do not cultivate the study of minor warfare, particularly so because the qualities of our men lead us to expect brilliant results therefrom, and also because we must be prepared for this form of warfare, if not from the offensive, at least from the defensive point of view.

The young officer leaves our academies fully equipped to lead an army to victory, but he is not in a position to provide for the escort of a convoy or to organize a surprise or ambush, yet these tasks occur far more frequently than that of commanding an army.

Small detachments are often composed of the three arms, and to the artillery—usually a battery—a line of action is often allotted which would be correct for a large unit, but which, for a small one, is truly contradictory.

The field artillery of the present day is too powerful to be assigned to small detachments, whose undertakings have generally the character of audacity and present risks. The risk cannot be extended to a few guns only since, by a natural evolution, the action of artillery to-day is indissolubly bound to the presence of entire organized units, such as the battery or brigade.

At the time of smooth-bore artillery,

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every piece acted on its own account, loaded and fired independently. Then the power of the artillery assigned to a detachment was proportionate to the number of guns, and as many of these could be detailed as were required. With the adoption of rifling, guns made their greatest advance, inasmuch as they were grouped together in one harmonic whole, the battery. To-day, with the adoption of shields and rapid fire, the greatest efficiency for the guns is obtained by forming them into a stronger unit than the battery, that is the brigade. Hence in the abstract, according to the artillery point of view, it would be necessary to assign to a detachment at least one battery and preferably a brigade.

But who would wish to be responsible for such a waste, especially as the power of modern artillery cannot be utilized in the action of a small detachment except in special cases. The artillery allotted to a small detachment is sacrificed because two elements, on which depend its efficacy. rapidly decrease as the strength of the detachment is diminished, and these are the depth of deployment and the duration of the action.

Infantry is the shield of the artillery. The more the front of the line of riflemen is limited, the smaller must be the distance between this line and the infantry. Up to a certain point there is no inconvenience, but beyond that point the disadvantages are great, and it will then be better to give up using batteries of guns and to employ instead batteries of machine guns.

Then as to time, it is natural that the duration of a fight should be dependent upon the forces taking part in it, and to this must be added that it is characteristic of minor operations to avoid decisive engagements.

Now for the artillery the time required to crush an objective, whether it be great or small, is, within certain limits, practically constant. It cannot even be said that in an engagement between small forces the number of objectives to be crushed will be less, because the advance will always be broken up, and what happens for the battalions of a brigade also happens for the companies of a battalion. So the usefulness of the artillery of a small detachment goes on decreasing with the diminution of the detachment.

This decrease of usefulness would in the main be tolerable, but the misfortune is that beyond a certain limit, the advantage of having artillery in a small detachment does not make up for the disadvantages. These are that artillery constitutes a check on mobility, which, in the operations of a small detachment, is the principal factor of success; also that artillery demands an escort, which absorbs a correspondingly greater proportion of the available cavalry and infantry as the strength of the force is decreased, because the size of the escort is a fixed one, and indeed it should even be increased as the extension of the firing line, that is of the natural protection, is decreased.

Nevertheless it cannot be denied that the allotment of artillery, even to detachments of limited strength, may in some cases be most useful; for example, when it is a question of overcoming the resistance of places organized for defence, as villages or defiles, and especially of creating an impression upon public opinion. In such cases, however, we must be very circumspect, and must not allow ourselves to be led away by the temporary help of artillery obscuring the difficulties which may be created by its presence at a later stage.

Often the attachment of artillery to small units is justified by the fact that in large fighting units of the great European armies, the proportion of artillery to infantry is about one battery to a battalion, and that this proportion can be spared for the formation of a detachment.

And here we repeat that it is a mistake to hold the opinion that the fighting of a small unit can reproduce, on a smaller scale, that of a large unit. We need only give one of the many reasons that encourage this idea:—The range of firearms does not vary in proportion to the forces engaged. Whence depth and frontage, the one dependent upon armament, the other upon force, can to a certain point remain in harmony, but after that they cannot. This is why the fighting of a small detachment cannot represent a great battle on a reduced scale.

The infantry drill book supports this principle, and distinguishes, in different chapters, between the procedure for an isolated section and that of the company and battalion. Why then should we not consider the method of action of a detachment of the three arms, and above all of small units of artillery.

The conduct of the batteries of a large unit is not the same for all, because different tasks are assigned to them though all act in harmony. Rapid fire and the shield have led up to this because these have imposed, for the attainment of the ultimate object, a co-operation which formerly was desirable but is now compulsory. In this respect some even go so far as to want to have no artillery with advance guards, on the plea that such employment of a few batteries will destroy the harmony of the subsequent employment of the main body of guns.

It is certain that the adoption of shields and rapid fire have imposed a special line of conduct. The fundamental rules on the employment of artillery, after the appearance of rifled guns—that is of accurate shooting—have not changed, but the means have changed. The artillery must, in the attack, prepare the way for its own infantry to get within effective rifle range of the opposing infantry, and then must add its fire action to that of the rifle. But to accomplish this, the method is different to what it was in the past.

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Nowadays, to paralyze or destroy the action of the opposing artillery, guns must push in to within 2000—2500 metres and use percussion shell, or else make use of oblique fire. Now how can they get in to such close range without the support of other batteries, and how can they use oblique fire when the front is limited.

We do not agree with the pedantic classification of batteries, after the French system, but there is no doubt that the behaviour of batteries to-day can no longer be that of the past, and that the task of commanding large artillery units is arduous and complex. Now is the time for this fact to sink in, and for these commands to be solidly organized in time of peace.

It is evident that if the artillery of a detachment consists of only one battery, it must be able to direct its fire in every direction, therefore for obvious ballistic reasons, commanding positions must be chosen. "Crucify him," will cry simple and orthodox individuals, who, putting exaggerated faith in the hasty deductions of the Russo-Japanese war, foretell the planting of artillery in gun-pits or absolutely behind hills. They justify themselves by exclaiming that the present means of laying allow for fire from any position whatever. This is a great mistake.

The present methods allow the guns to be layed so that if no obstacle interrupts the trajectory, the projectile hits the mark, but unfortunately a shell has not yet achieved the virtue of passing through the earth like the X-rays. A digression here concerning the Russo-Japanese war is allowable. We have been too apt to draw conclusions from this war about the future action of artillery. It is odd that such deductions have been so easily arrived at and now form, for some people, the gospel for the employment of artillery, quite forgetful of the capital fact that the artillery of neither side, except one Russian battery had shielded quick-firing guns. Likewise it is forgotten that only the kind of warfare—of positions—of the battlefields of Manchuria could favour the organisation of such complicated systems of fire, which would certainly fail if employed in a battle of encounter. The chief characteristic was the use of long range fire, a tactical error from which sprang many difficulties. Artillery does not, in this way, obtain those rapid and decisive results of which its power to-day is capable. It reaps but partial successes, at the price of a wasteful expenditure of ammunition.

Bearing in mind all that, or rather the special character of that war, we believe that very few positive lessons are to be gathered, indeed for the most part they are negative lessons which tell us what should not be done on the battlefields of the future.

From what has been said so far, it appears that two things can be deduced:

(1). In the majority of cases, artillery should not be attached to small detachments.

(2). The conduct of artillery, when, as in exception, it forms part of a detachment, should be guided by special ideas, different from those which regulate the employment of the artillery of a large unit.

Let us now see how to fix some ideas upon this second point, and we will take the limited case in which the artillery of the detachment consists of one battery.

The battery coming into action:—

In the action of a large unit, the artillery of the defence should not open fire too soon. Numberless reasons support this contention, of which the chief one is the importance of hiding from the attacker for as long as possible, the position chosen by the defender and more particularly by his batteries.

For a small detachment, the case is radically the opposite. It is of no importance whether it reveals the position too soon, for the chosen position must be clearly shown by the lie of the ground. It will not be dangerous to reveal the position of the battery; shields make it invulnerable, because the attacker will find it very difficult to bring oblique fire to bear, and will certainly not wish to embark upon the arduous undertaking of trying for direct hits with percussion shell at the expense of his most important task, the support of his own infantry.

We have seen then that it is not dangerous for the battery on the defensive to open fire even at long ranges. On the contrary it is advantageous, above all to allow the battery to act for a little longer, and so gain compensation for the short duration of the engagement, also to force the enemy to deploy prematurely and so lose time, and to allow its own troops, if necessary to withdraw in good time from the combat. It must not be forgotten that, as stated above, it is a characteristic of small detachments to avoid decisive engagements.

The attacker will have to come into action as near as possible to the fighting line, that is late. The reasons are self-evident: above all to be in a position to act effectively against shielded artillery (range 2000 to 2500 metres), secondly to so place himself that he can act uninterruptedly throughout the whole engagement, avoiding changes of position which, while depriving the infantry of support, represent for the artillery periods of dangerous crisis. It must again be expressed that there must exist, in the original plan, harmony between frontage and depth.

It is perfectly true that, by acting in this manner, the attacking artillery must leave its infantry to advance unsupported to within medium ranges, but this is a minor evil. The advance of the small fractions of the detachment can always be carried on without heavy loss, because they can always get sufficient cover from the ground and quickly get away

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from the fire action of the defender, which, in addition, can only be directed on one objective at a time. Anyhow the lesser of two evils should be chosen, and the infantry should be prepared to sacrifice artillery support during the approach march, so as to have it when they get within effective rifle range.

Character of positions:—

It has already been said that the weak artillery of a detachment must choose relatively commanding positions, so as to ensure continuity of action. That does not mean that the guns cannot be so disposed as to be completely under cover, but they must be posted so that they can be rapidly dragged to the crest by hand whenever the exigences of the fight may demand this course.

Choice of objective:—

The idea of shelling the target which is most threatening at the time can be taken as a rough guide. However, seeing that to reduce a shielded battery to silence is, in the majority of cases, a long and arduous undertaking, it is clear that fire should be directed upon the enemy's artillery only in exceptionally favourable cases, and when it cannot be directed upon his infantry.

Attention has been invited to these points because they appear to be those of the greatest importance, but there are many others to consider about the methods of employment of a small unit of artillery assigned to a detachment.

For example, the small amount of protection, which the fighting front of a small unit offers to the battery, demands greater protection for the various elements composing the latter. So it will be necessary to keep the limbers and first line wagons closed up, so that the escort may provide properly for their defence. The protection of the limbers is specially important, as their capture would completely paralyze the mobility of the detachment.

Another necessity which presents itself is that of creating in small artillery units the organisation for communication and command which exists in larger units, whose importance does not vary whether one or more batteries are involved, and which enables fire to be directed in accordance with the tactical situation.

In this short article there is certainly no pretension to lay down the law upon the employment of small detachments, still less to formulate rules for the employment of small artillery units. We shall be happy if we have but called the attention of tacticians to a subject too often neglected in the past.

Certainly many of us, modest commanders of batteries, have often found ourselves at a disadvantage at field days. Torn between the teachings of grand warfare and our own opinions, we have often had to fall back upon the latter. But—how often have these been approved by our judges?

J. G. Dooner, Capt., R.F.A.

Long Distance Riding.

By COLONEL SPOHR (Retired).

Abridged Translation from "Jahrbücher für die Deutsche Armée und Marine," May, 1910.

Long distance rides will often have to be undertaken at short notice on active service; and it will then be found to be a great advantage if rider and horse are both in good condition. With regard to the former, it is genarally admitted that alcohol and narcotics are bad, while vegetarian diet is coming more and more into favour; but our present remarks will be confined to the horse .

We may take it that a horse is in good condition when it has sound legs, is free from chronic defects which point to previous ailments only temporarily cured by medicine, has healthy lungs and heart, and is hardened by good training and muscular development. With a horse like this one can start on any long distance ride which is not altogether beyond the powers of men and horses; and any military horse which is well cared for ought to be able to cover 50 miles a day in marching order, or about 300 miles a week, allowing for one day's rest.

Lately, however, there has been an evil tendency to use artificial foodstuffs and medicaments, though their bad results were clearly seen during a recent ride between Vienna and Berlin.

The unfortunate animals are—doubtless with the best intentions—given sugar and sugared water, malt stuffs, diastasolin, etc., and their legs are rubbed with various fluids, spirits, artificial lotions, and vinegar, or bound round with bandages when there is no need for it whatsoever. Physiology shows clearly that natural products such as oats, hay, straw, green forage, etc., supply all the vital elements that a horse requires, while these chemically prepared and concentrated foods have less value, and are even bad for animals.

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In a book like General Daumas' "Les chevaux du Sahara," or Count Wrangel's "Book of the Horse," there are records of astonishing feats—chiefly by Arab horses. There have also been many recent accounts of long distance rides, one of the most interesting of which is Freiherr von Esebeck's diary of a ride from Demmin (near Stralsund) to Copenhagen.

Even the author's motive for this ride is interesting. He wanted to visit a friend living in Copenhagen, a German and a great lover of horses, who was on the lookout for a good East Prussian horse. It seemed a good opportunity to combine the experience of a long distance ride with the pleasure of presenting a suitable animal in person.

Freiherr von Esebeck first tried a six year old mare, but she was not a success. Though showing every external "point" that could be desired, her digestion was unsound, and after a two days' trial ride she was unable to take her food. May this not have been the result of previous feeding with artificial diet?

The mare was accordingly sold again, and in her place Freiherr von Esebeck brought a gelding called "Croesus," which had admirable points, though also a few structural defects. He had a chronic swelling of the bone on the off hind, the result of an early accident in stables, while there were traces on each foreleg of old inflammation of the sinews which had been treated and cured at the time. Before trying this animal in a long distance ride, it was clearly of the utmost importance that these points should be attended to, and Freiherr von Esebeck was confident that the horse's sound constitution would prevail, assisted by vigilant and careful treatment on his part.

His equipment was adopted to this end. He carried a goodly supply of stores,—amongst others some essence of camphor, some alum, a bottle of pure balsam, sponges, grooming kit, woollen bandages, etc. He used a Pelham bit, and rode without spurs, carrying only a riding whip, which he lost on the way.

At the end of the first day, Freiherr von Esebeck had to apply some balsam, and to use a protecting pad, on the off hind, as the horse had been "brushing" slightly. I would personally have been content with bathing the wound in cold water, and, provided the shoes were found to be fitting well, with careful riding next day—as it happened in this case, the pad was left off again after the second day.

At this stage of his narrative, the author treats us to a description of the sugar diet on which "Croesus" had been fed for six months previous to the ride. In addition to his service rations, he had been given two pounds a day of a mixture of 80% sugar and 20% rice, besides 2 lb of "Maltose" (a malt product prepared in Munich), and 1 litre of "Diastasolin"—we are told that "Croesus," put on 132 lb in weight during six months of this treatment. If he had been fattening for the slaughter-house, this would have been a triumphant result; but as he lost 94 lb again in covering 400 miles in eight days, I cannot see that this increase pointed to good condition. The author goes into minute details about the care bestowed upon "Croesus"; but he appears sometimes to have overlooked the fact that a horse cannot be stuffed full of food as an engine can of coal and water. With horses, as with men, an overloaded stomach is by no means conducive to activity, but rather to heaviness and sleep. We are told that at his evening feed at the end of the first day, and his first feed next morning, the horse ate 20 lb of oats! But as he was only *seen* eating 6 lb. at night and 2 lb. in the morning, I simply cannot believe it, and am inclined to suspect that part of the remaining 12 lb. went elsewhere.

The back and legs were carefully rubbed with alum water at the end of the day, and the legs were bandaged and left in camphor.

On the second day "Croesus" could neither drink nor stale after 22 miles, and showed symptoms of pain which pointed to colic. A "Vet." was called in, and gave an injection of morphia which put the animal right and enabled him to resume the journey for several miles further. A shower of rain came on which had a wonderfully bracing effect; in my opinion it was a natural cure asserting its superiority to all these artifices. For on the third day there was reaction from the morphia. The horse broke down in Kiel; fortunately the rider gave him no more medicine, but merely went on slowly to Eckernförde, leading "Croesus" part of the way, and nature reasserted her healing powers.

During succeeding days the artificial treatment continued, though varied from time to time. Finally "Croesus," when he appeared to be tired, was given bread soaked in beer—another mistake; for although the quantity of beer may have been too small to have immediate bad effects, still alcohol (or "Lupulin," the equivalent in beer) has the same results with animals as with man.

The care bestowed upon "Croesus" during his transport by sea and rail between the mainland, Zeeland, and Fünen, saved him from all discomfort, and he was eventually sent home by rail. We are not told why the gentleman in Copenhagen did not buy him. Perhaps he did not like the look of the chronic flaws in his legs. Defects like these, far from being removed by artificial rubbing, are carefully prolonged by it; only the simplest and most natural treatment is effective.

I can speak from personal experience—I had a mare called "Agatha" many years ago, on which I frequently rode between 60 and 70 miles a day for several days running, starting about 6 a.m., and returning towards 10 p.m. With a pause of about two hours in the middle of the day. Only on rare occasions did the mare show signs of much fatigue, and

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that was after heavy hill climbing.—I never gave her more than her service rations on these occasions, with about 1½ lb. of hay. She was never galled or "out of sorts," and never went lame.

Again in 1862, I was selected as the best mounted officer of the 8th brigade of artillery to take control, during practice, of the precautionary arrangements, etc., over an area of about 12 miles. On this occasion I was once 23 hours in the saddle, from 1 a.m., to midnight; I had to ride over my course six times during the firing, which made about 70 miles, then to draw in the outposts, collect the projectiles (as the custom then was), and come back late at night. The mare I was riding, "Juno," had no food all this time, and no water after midday. When I got back and dismounted, Juno broke away from the groom and sprang into a dirty puddle to quench her thirst. Before he could put on anything to wade in, the deed was done, and she then came back to him quietly. She was none the worse, however, for drinking dirty water. She fed well that night, and was as fresh when I took her out again at six next morning, as if she had only been out to exercise the day before.

Colonel Barrow, who commanded the 19th Hussars in the Soudan Campaign under Lord Kitchener, says that during the final march on Metemneh, the horses went 55 hours without a drop of water, and with only 1 lb of corn each. About 15 or 20 of them were 70 hours without water. "They remained in good condition with 4lb. oats and 3 gallons of water, while with 8 lb. a day they made two marches of forty miles each.

I may in conclusion give a short account of my own last small effort in this line, during some manœuvres of the 18th Army Corps near Giessen in 1906, when I was 78 years of age. I used to start off at 6 a.m., ride some fifteen miles in two hours, to the scene of operations, stay there till about mid-day when they ended, and then ride home, more leisurely than I went out. On the whole I used to cover about 70 miles a day.

The mare I rode, which belonged to a friend of mine, ate nothing while I was out, though I watered her frequently at brooks. She got no extra forage; her legs were hand-rubbed and groomed, but not treated with any medicaments; and she kept fit throughout. Only on the third day, during the latter part of the ride home, did she show any particular signs of fatigue.

I sincerely trust Freiherr von Esebeck, will succeed in freeing his "most loyal friend Croesus," from the defects in his legs, but at the same time I feel convinced that it can only be done by those simple and natural methods on which I have laid constant stress in my writings on these subjects. All other methods lead only to the slaughter-house!

K. B. Ferguson, Lieut., R.G.A.

Neue Militärishe Blätter.

Précis of Contents of Nos. 3, 4, and 5, 1910.

No. 3.

1. The 27th of January. The birthday of the German Emperor.

2. The fortifications of the German frontier of France.

3. The past and future of Austria as a Power.

The causes of the defeat of the Austrians in 1866. Friedjung and Just's opinions. The Parliament and Liberal press in 1866 did all they could to weaken the army. On the other hand men in Germany like Bismarck, Roon and Moltke undertook the thorough reorganisation of the army. Königgrätz. A comparison between Austrian and Prussian losses. Intervention by France.

Present state of the army, really 19 battalions weaker than 40 years ago. Progress in the navy, even worse.

4. The Turkish soldier.

Splendid material for forming frontier guard troops. An account of life among them.

5. Tschangtschitung, China's great statesman.

6. The heavy field howitzer 1902, and the reasons for its adoption.

The defects of the short 15 cm. gun, and the 15 cm. mortar; and the introduction of smokeless powder, led to the construction of a 15 cm. howitzer. Krupp in 1891 undertook this. After trials Krupp supplied the guns, while the carriages and limbers were made at Spandau. Shooting off hard ground without platforms was found reliable. The howitzers were introduced in 1893. As far as manœuvring on soft ground was concerned, they were useless. In 1899 a heavy field howitzer was introduced. In 1902 a lighter howitzer, recoiling on its carriage, took its place. Many alterations and modifications were afterwards made, and the artillery has now a high angle gun of mean calibre, which fulfils all requirements as regards ballistics, mobility and service requirements.

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7. An increase in the personnel for airships in France.

No. 4.

1. A German landing in Ireland.

2. The Dutch army. Latest news of interest.
The defence of the island of Java, against attack. Instructions of 1909. A new manual issued.
The army estimates for 1910.

3. The Turkish soldier. (Conclusion).

4. A Lecture by Major von Parseval.
An interesting article going into the details of construction, etc., of the Parseval.

5. Russia, ready for war.
The article "The Russian Army and its defence," which appeared in the "Neue Militärishe Blätter," is discussed and criticised.

No. 5.

1. Drill and Training.

2. The Russian aspect of the tactical training of the German and French reserve officers.
Short time available in Germany for candidates for commission in their preparation for entrance examinations course at the War College restricted to 8 or 9 months.
Before entering the War College, all candidates must serve six months in the ranks.
Ensigns of all arms instructed together. No special course for the study of campaigns. All exercises are carried out with small bodies of troops. Instructors at the War Colleges are chosen from those officers who have done well at the Staff College; and these instructorships are considered good posts, and assist officers in their future career. Four to five years is the length of these appointments.
Military topography is also taught. Map reading. The conviction of success in war is instilled into every student. The final examination is all practical.
General system of instruction in the German army as follows:—Simple, practical, uniformity in methods, initiative encouraged, interest of students always maintained, improvement of moral qualities.

3. A new infantry training for the Japanese army.

4. The development of modern airship material in the last few years.

5. The heavy German artillery of the field army. Armament. Great mobility necessary. Supply of ammunition.

6. The mobile French Army Corps.
Organisation. Infantry, Cavalry, Artillery.

7. Articles of interest from military periodicals. German and of foreign nations.

(1). Germany. Ten periodicals.

Corrigenda to August No. of 'R.A. Journal.'

"Translations," page 76, line 16 from top, *for* 5·2-inch (65 c.m.) *read* 2·56-inch (65 m.m.).

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Field Guns *versus* Howitzers for Field Artiliery.

Translated from the Russian Artillery Journal, June, 1910.

It has lately been suggested that a light howitzer should be adopted for arming the field artillery. This is a question of great interest to all gunners and it is proposed in this article to compare the capabilities and possibilities of the gun and howitzer.

Those in favour of the howitzer argue that nearly all targets offer a larger surface in the horizontal plane than they do in the vertical, and, therefore, it is better to hit them from above and from the front than from the front alone. This means that the greater the curve of trajectory the better the results obtained. Generally speaking this view is correct, but as to whether a curved or a flat trajectory is the more advantageous in any special case depends on a number of circumstances varying with the position and locality of the target. Every target has three dimensions, height breadth and depth from front to rear and the greater the depth the flatter should be the trajectory in order to sweep the whole area with bullets.

A shield one metre high is equal to a horizontal target whose depth is 120. 60 or 30 metres according as the angle of descent is ½. 2 or 3 degrees.

It is only when the angle of descent exceeds 45° that the horizontal depth is less than the vertical height.

If the target be one of considerable depth, e.g. columns of infantry, artillery in column of route, or lines of skirmishers in enfilade, its vulnerability does not depend on the point of view from which it is regarded, either horizontally or vertically.

If it is considered vertically then the height (H) of the target equals the sum of the height (h) and the depth (t) multiplied by the tangent of the angle of descent ϕ (see figure 1) *i.e.*, $H = h + t \tan \phi$

If it is considered horizontally, then the depth of the area (T) covered by the bullets equals the sum of the depth of the target (t) and $h \cot \phi$ i.e. $T = t + h \cot \phi$

As the angle of descent increases the vulnerable area increases vertically and decreases horizontally.

One must differentiate between what is meant by horizontal and vertical targets, and in order to do so a horizontal target is taken to be one where the depth (t) is greater than the depth of the area swept by the bullets, whilst a vertical target is one where the depth is less than it.

As the range increases every target becomes more and more a horizontal one, because the area swept by the bullets becomes smaller.

Whether it is more advantageous to use high angle or direct fire, i.e. whether a howitzer or a gun would be the more useful, depends on the special circumstances of each case.

With a well trained detachment it is usually found that flat trajectory fire has less error as regards elevation and more as regards range than a curved one.

Errors in laying for elevation are the main cause of differences in range and therefore of inaccuracy of fire.

A mistake in laying for elevation affects the height of burst practically the same amount in each case, but on the other hand an error in the range makes a far greater difference when firing with a flat than with a curved trajectory.

Against horizontal targets the accuracy of fire with a curved trajectory decreases much less quickly than with a flat one.

As soon as an error in firing occurs the capability of the weapon for doing damage decreases, and with high angle fire the number of hits obtained decreases more quickly than when firing direct.

As during a battle absolute accuracy of fire is scarcely ever possible it should be remembered that the total area swept

Figure I.

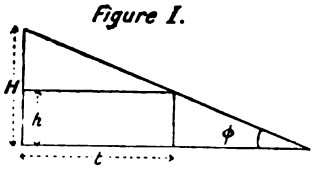
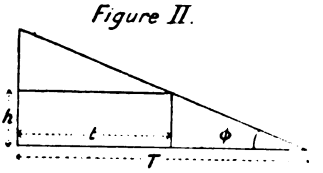


Figure II.



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by the bullets bears a direct relation to the area swept by the bullets of each shell, and therefore the gun is the more valuable weapon.

When however the question of the destruction of targets behind cover is raised, the vulnerable area increases as the angle of descent becomes greater and in this case the preference must be given to the weapon with the steeper angle of descent.

When firing with bursting projectiles the maximum amount of damage will be done when the axis of the cone of burst (splinters and bullets) covers the object aimed at.

Targets close behind cover cannot be hit when the angle of descent is small, and therefore shrapnel from field howitzers is of greater value in this case than that from field guns.

In order to have good results one must either fire very accurately, which demands a lot of time and care in ranging, or else be able to switch the fire over the whole area and plaster it with shell, which entails a senseless waste of ammunition.

For engaging shielded batteries a howitzer possesses an undoubted advantage over a gun, though this advantage does not appear so very obvious when the following data are considered:—

At a range of 3000 metres the angle of descent of a field gun shrapnel is roughly 8½ degrees, the angle of burst of the bullets about 17½ degrees, so that when descending at the maximum angle the bullets have an angle of descent of at least 26¼ degrees; therefore in one metre the trajectory drops 30 cm.

With a field howitzer on the other hand the angle of descent is 13 degrees and the angle of burst of bullets is 20 degrees, so that the lowest bullet strikes at an angle of about 33 degrees which means that in one metre the trajectory drops 42 cm.

If the height of the shield is taken to be 1·6 metres and a gunner 1·2 metres high is sitting at a distance of one metre behind the shield, it will be seen that he is theoretically quite safe from shrapnel fire whether from gun or howitzer.

Even if the above data be not altogether correct (*e. g.* The French shields are somewhat lower) the result nevertheless remains practically the same and the detachment remains almost untouched by bullets passing over the top of the shield.

The maximum effect will be obtained when the shrapnel burst close up to the shields and the bullets and splinters find their way through the interstices. For this purpose the howitzer is more valuable than the gun owing to the larger number of bullets and splinters contained in its shell.

On examining a collection of range reports and judging by the number of hits compared to the number of rounds fired, the howitzer appears to be the more effective and deadly weapon, but when one compares these results with the weight of the ammunition fired or with the time occupied while doing so, one finds it difficult to prefer the howitzer to the gun.

In firing at shielded batteries where direct hits are desired, it is a great advantage to be able to see the targets from the guns and to be able to observe the fall of the shell. When trying for direct hits accuracy and steadiness in shooting are essential. A comparison between the accuracy of a howitzer and a gun is given below:—

While experimenting with a 75 mm. Q.F. field gun, the mean error in elevation at 3000 metres was 3·8 metres, and the mean lateral error 2·1 metres. The product of these two mean errors equals 8 square metres. With a 10·5 c.m. Q.F. field howitzer the mean were 5·4 and 2·8 metres respectively, their product being 15 square metres.

From this it is seen that the accuracy of the gun is almost double that of the howitzer. For searching or sweeping an area it is better to use a gun owing to the greater area covered by its bullets. (The area covered by a shrapnel from a field gun is 60 per cent greater than that of a shrapnel from a howitzer).

Great results are seldom obtained when trying for direct hits, though the damage caused by the splinters of a howitzer shell is of course greater than that of the gun as breaking up into many more pieces of greater weight they are better able to pierce the shields.

While satisfactory results with a field gun can only be obtained from shell bursting directly in front of the target, howitzer shell falling in the intervals between the targets or even behind them often cause damage. This is owing to the steep angle of descent whereby splinters are often blown to the rear and to the sides.

Still more effective are howitzers when a chance occurs of firing against an enemy behind cover. To do this however very accurate ranging is required, as otherwise the waste of ammunition is enormous.

It is interesting to note that the French are adopting a type of shield affording overhead cover to the gun detachments.

The destruction of hostile artillery will seldom occur, because it is very rare that guns will be placed in such an exposed position that this will be possible.

Usually the most that can be hoped for is to silence the guns by causing casualties among the detachment, by preventing movement within and to the rear of the battery and by creating a thick veil of smoke along the front, thereby spoiling their view.

When firing against concealed or semi-concealed targets good results will seldom be obtained. For this type of target guns are preferable to howitzers owing to the greater depth of their cone of burst.

It may be noted that Frederick the Great was especially partial to howitzers, for which he often prepared epaulments and pits, using them always as a weapon of defence.

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This historical story, however, cannot be taken seriously when comparing the capabilities of howitzers and guns of the present day.

The heaviest guns in those days only fired a shot weighing about 5 or 6 kilograms which is considerably smaller than that fired by the lightest modern field gun.

In order to reduce the weight of the artillery and that of its wagons, the only course apparent in those days was to shorten the muzzle and lessen the charges. That by so doing the trajectory became more curved was looked upon as an unavoidable evil which had to be endured. The idea of firing at targets behind cover was of course never dreamt of.

Later on light mortars made their appearance but were soon discarded as they did not do all that was expected of them.

The majority of the howitzers of the next period were of 15 cm. calibre and fired shell weighing about 7 kilos. with a weak bursting charge of black powder.

Nowadays field guns fire a shell of about this weight, filled with a strong bursting charge and possessing considerable powers of penetration.

The problem of destroying targets behind cover was first grappled towards the end of the war of liberation by Prussia, who possessed a number of short howitzers. In the majority of other countries only long howitzers were in use.

Considering the subject as a whole and taking into account all the above mentioned points it must be acknowledged that under modern conditions the weapon for field artillery is undoubtedly the gun.

No one will deny that light howitzers would at times be invaluable, and the time will come when every infantry division will be equipped with three howitzer batteries acting under the orders of the infantry commander. When this takes place howitzer batteries will need a large quantity of ammunition and whether this is to consist of shrapnel or high explosive shell only actual trial on the field of battle can decide.

As their duties will largely consist in the destruction of cover, it is probable that an universal shell combining the qualities of both will shortly be introduced.

The question of the use of heavy howitzers does not come within the province of this article, but it may be added that the general view taken of this arm is they entail a useless waste of a heavy and expensive projectile.

In conclusion it may be stated that field howitzers under certain conditions are extremely valuable, but the suggestion that they should supersede guns as the armament of field artillery is ill-considered and bad.

J. K. L. Fitzwilliams, Lieut., R.F.A.

Use and abuse of artillery in the Russo-Japanese war

Translated from the Russian Artillery Journal, July, 1910.

During the opening stages of the war in the Far East, the Russian artillery never attempted to take cover, but came into action on the open plain or on the crests of hills, where terrible losses were inflicted upon them by the Japanese shrapnel.

Later on it began to dawn upon them that covered positions were preferable. According to reports emanating from Russian sources the results were brilliant.

If this was the case, why was the Japanese artillery not only able to hold its own, but also able to give effective support to its infantry? We read accounts of batteries placed behind cover and their fire being directed by the battery commanders from observing stations some kilometers distant. "Dial Sight and Traverse" was the cry of the day. After a preliminary round or two, the range and fuze were found and the effect was enormous!

This is what we read in the reports, and now we will consider the question critically.

No one will assert nowadays that firing from behind cover is difficult, but to do it successfully a well worked out system, such as exists in the French artillery, must be adhered to. The Russians knew this, but nevertheless made extraordinarily slight use of their knowledge.

When war broke out, directors, telephones and all such other technical instruments were absolutely unknown to the men. Remembering that the majority of the rank and file were illiterate, it must have been a matter of considerable difficulty to drive into them quickly the necessary knowledge of telephony, signalling, indirect laying and all the indispensable requirements of a position behind cover. In no Russian report, which has so far come to light, has any difficulty with respect to the above points ever been mentioned. Everything went smoothly and the results were invariably brilliant!

The Russians assert that their tactics were based on a study of those laid down in French drill-books. If so they quite failed to detect that the underlying principle of all French regulations is to attack and that only by attacking is success possible. Every page breathes the note of attack, in fact in the whole book only seven lines are devoted to defensive action.

The Russians violated this principle

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from the beginning to the end of the campaign, especially as regards artillery, the tactics of this arm being based on a struggle from behind prepared and strongly entrenched positions. They forgot that the main rôle of artillery is to support infantry. To do this guns must be brought at all costs close enough to the front to keep touch with the infantry, and to be able to watch and immediately take advantage of the movements of the enemy.

They became obsessed with the idea that the guns had to be placed behind cover, and in consequence often chose positions, where the guns were quite safe, but omitted to notice that on account of the long range the enemy enjoyed equal security.

The actions of Colonel Slysarenko's brigade at Lioa Yang, minutely described in his report, so exactly illustrate the fantastical notions about covered positions prevalent in the minds of the Russian commanders that I will give them in detail.

On the night of the 29th August he was bivouacking with his brigade near the village of Sitchan. About midnight he received orders to take up a position at dawn in support of the artillery of the 3rd division and to operate against the hostile troops along their front.

By the light of a candle he examined his map and concluded that the Japanese batteries were posted either on the top of three hills or close in rear of them. At 3 a.m., he sallied forth with his brigade staff to reconnoitre the gun position, which he had chosen on the map. At 5.30 a.m., the batteries were in their places and ready for action. Pits had even been dug for the detachments. Each battery ascertained the least elevation to clear the crest and it was found that the dead ground extended for 2950 metres in the one case and 2500 metres in the other.

At dawn the Japanese opened fire on one of the batteries of the 3rd division. Slysarenko, armed with directors and plotters and accompanied by signallers, started off to find an observing station. The only suitable place happened to be on one of the most inaccessible hills in the vicinity. From thence he discerned puffs of smoke denoting the position of the Japanese batteries. They had opened a heavy fire, and each gun was visible to the naked eye.

Having set up his director, he made the necessary calculations and sent down his orders. Fire was opened about a quarter of an hour later and according to the observation of Slysarenko it was most effective.

After twenty minutes firing the Japanese guns, numbering 24, were destroyed.

No. 1 battery then ceased fire and No. 2 battery was switched on to twelve guns further to the left.

In a few minutes these also were destroyed, and the artillery of the 3rd division was able to advance unmolested.

The further actions of Slysarenko's brigade are of no importance, but what has been described above is worthy of comment. Slysarenko had succeeded admirably, according to his own account. It is quite possible that the Japanese batteries were reduced to silence, and that the artillery of the 3rd division was able to take up its appointed place on the battlefield, but it is instructive to note how much was due to skill and how much to chance.

It is perfectly correct to precede reconnaissance by a careful study of the map, but the actual reconnaissance of the ground in this case was highly insufficient. The position was chosen, not because of its suitability for attack, but of its safety from attack.

The chief characteristic of a good position is either to be able to see the target from the guns, or from some point close at hand, the closer the better. Nothing could be seen of the target from the guns nor from the ridge to their front.

The brigade commander only began to look about for an observing station when the enemy opened fire and then could only find one on a distant hill hard to approach. To have found an observing station there was a lucky chance. The observing station should have been chosen first and then the position for the guns, not vice versa.

Valuable time was lost before the brigade opened fire in assistance of the battery of the 3rd division. The Japanese had at least half an hour, in which to shell their target before they were disturbed. Their guns must have been indeed badly served, if in this time they, with 24 guns, were not able to do considerable damage to their helpless and unsupported objective.

One cannot help asking would it not have been better to have been satisfied with less cover, and to have been able to open fire sooner? I will make no comment as to the firing of the series, but it sounds nothing short of wonderful that the range and fuze were found with the first round and that no subsequent corrections were deemed necessary.

Nothing succeeds like success and perhaps it is unfair to criticise the procedure adopted, but it would have been much better if Slysarenko, instead of commanding the brigade himself as if it were a single battery of 16 guns, had taken the two battery commanders up to the observing station and allowed them to make their own arrangements. Unfortunately we have no official accounts of the Japanese losses in detail at Liao-Yang, but according to the report of a German Staff officer standing near the batteries shelled by Slysarenko, the casualties were practically nil. "It appeared" he says "as if the Russians were unable to observe their fire, owing to which the shooting was very erratic and the majority of the shell burst so high that their effect was infinitesimal."

In direct contradiction to the reported destruction of the guns by Slysarenko on the 30th is the fact that these same guns were able to re-open fire on the 31st from the same positions.

If the effect on unshielded stationary

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batteries was so small, it is easy to guess how much support Slysarenko's fire would have given to the Russian infantry.

The Japanese artillery probably ceased fire because their target had vanished and they did not consider Slysarenko's brigade worth firing at. There is some excuse for the Russian's love of covered positions for bitter experience in the early days of the war had taught them to avoid placing their guns in the open.

In the European theatres of war of the future artillery will be massed and a certain proportion of batteries will of necessity be placed in the open owing to the lack of cover. Shields will be an absolute necessity in order to lessen casualties, in fact to save batteries from being absolutely annihilated.

Advantage must naturally be taken of all available cover, but only when the freedom of action of the guns is not thereby impeded. If artillery only seeks safety for itself instead of occupying positions,whence it can render the maximum amount of support to its infantry, even greater fiascos will occur in the future than took place in the Prussian artillery in 1866 or in the Russian during the late war in the Far East.

Artillery must be able to do without cover when necessary, and must always remember that effect is of more importance than safety.

If successful results can be obtained from covered positions—well and good, but otherwise artillery generals must have the moral courage to expose and even sacrifice their guns when critical situations demand it. Peace manœuvres create far too great a tendency towards the taking of cover.

Far distant observing stations are only to be recommended for heavy howitzers or guns of position. The value of telephones between batteries and their observing stations in European wars, when artillery brigades stand close together, will be a very doubtful quantity. Battery commanders will have to keep close to their batteries and must bring them into position close to their observing stations.

The smartest artillery subalterns will continually be employed on reconnaissance duties, and battery commanders will not be so well supplied with officers and capable N.C.O's that they will be able to detach themselves from their batteries.

If a covered position is to be occupied, the battery commander must have some sort of observation ladder, capable of being erected in the battery, in order that he may remain with his unit.

J. K. L. Fitzwilliams, Lieut. R.F.A.

The employment of Artillery at the battle of the Sha-Ho.

Translated from "Artilleristische Monatshefte" for July, 1910.

The Japanese General Staff has just issued a further instalment (Nos. 45 and 46) of their official history of the late war, dealing with the battle of the Sha-Ho.

Considering how unwillingly the Japanese impart any information about their army or navy to the outside world, and how they grudged foreign officers any near sight of the actual fighting during the war, this account which describes every incident of the war down to the minutest detail, is very remarkable. It certainly provides the most fruitful and reliable material for the study of the great 10 days battle.

The work is particularly interesting from an artilleryman's point of view, as it describes many incidents which should prove highly instructive but which otherwise have escaped notice.

Many instances are described of the artillery failing to do what was expected of it. This was frequently caused by the guns not being able to get within range. Another cause of failure was too high a point of burst for shrapnel, and a great deal of ammunition seems to have been wasted by the searching of unoccupied ground.

A case of extraordinary waste of ammunition which is described here for the first time occurred on the 15th of October, when the commander of the 35th infantry division wished to prevent the southward movement of a large force which he imagined concentrating south of Linschimpu, and accordingly directed a vigorous searching fire against the area where he imagined the concentration to be taking place. 8000 rounds were fired by 48 guns.

During the twenty minutes they were firing, each gun must have fired between 8 and 9 rounds a minute. With this rate of fire, and with that equipment no accuracy of laying was possible. According to (Russian) eye witnesses the effect was "magnificent," but as the Japanese make absolutely no mention of it, this is very much to be doubted.

Unfortunately there are no figures available as to the net expenditure of artillery ammunition during the war.

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This is the more remarkable, as there are most exact statistics as to the rifle ammunition.

There is not so much evidence as one might expect that the Japanese fully realized the necessity of continual support of the infantry by the artillery. There is however one very good instance of such support in the attack on the heights east of Wahopitzky by the 11th infantry brigade on the 14th of October. While three brigades were employed in keeping down the fire of the enemy's guns, one or two batteries were held in readiness to accompany the advancing infantry to the attack.

After the enemy's artillery had been silenced the Russians were kept down in their trenches by shrapnel fire, so that the attacking infantry who were also favoured by mist on the low lying ground, pushed on with very little loss.

Immediately the position was taken artillery was brought on to it, and poured an over-whelming fire on the retreating enemy.

The batteries which were advanced with the infantry had been set apart for this purpose from the commencement of the action, not merely batteries advanced from their first firing positions.

How these guns performed their duties is not related, but as they were on the spot when they were required, they must have conformed to every movement of the infantry. On this occasion the artillery appears to have ceased firing as soon as the infantry got close to the enemy's position, but on other occasions they continued firing till the last minute, so much so that some shells actually burst among their own infantry.

In the engagement at Shanlinhotsy on the 12th of October the Japanese adopted the very successful expedient of moving artillery by single guns across ground on which the enemy had already ranged, where an entire battery would have presented a very easy target. It was tried again on the 14th of June at Wafanwopŏn under shrapnel fire, but with much less success.

Artillery Reserve:—

The opinion has hitherto been held that an artillery reserve was only employed on the Russian side, but it appears from this account that the Japanese commanders kept a portion of the artillery of each division in reserve. This is the more surprising as the Japanese organisation provides several unallotted brigades of field artillery to be placed at the disposal of any divisions requiring more guns as the action develops.

The employment of these reserves on the part of the two combatants was fundamentally different. The Russians never used them until very late in any engagement, and often indeed not at all, while the Japanese brought them up as soon as it became evident where extra artillery was wanted.

Heavy Artillery:—

A great deal was made in this country during the war of the great results achieved by heavy artillery in the field, but this history does not testify to this as much as might be expected, and in the battle of the Sha-Ho the heavy artillery seems to have played no important part.

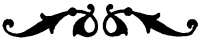
The Russian organisation provided six mortar batteries, and the Japanese are said to have had heavy artillery in their general reserve, in addition to a 10·5 cm. battery captured at Kintschon. There are however no exact figures available. These guns were used on both sides, but the results attained by them do not testify at all to their usefulness in the field, but rather the reverse.

Some heavy mortars took part with several field batteries in the bombardment of the Japanese trenches at the Tumentsylin Pass but "apparently with indifferent success."

On the 17th October, the Russians intended to prepare the southern portion of Shahopu for assault with mortars, but were unable to do so as the mortars did not arrive in time. During the night of the 17/18 of October, one of these heavy batteries advanced to within 600 metres of Shahopu, but was immediately overwhelmed by rapid fire before a single round had been got off. On the same day the 1st East Siberian mortar battery, in the XVII Army Corps had bombarded Linschimpu but without any success. The Japanese did not vacate the place.

On the Japanese side, the 10·5 cm. battery took part in the engagement on the 12 of October, with the advanced guard of the Russian XVII Army Corps, but there is no mention of it having materially affected the result. There are doubtless reasons why the heavy batteries in each case met with such small success, but it is quite clear that in this battle at any rate, they entirely failed to distinguish themselves, in spite of ample scope for their employment.

A. C. B. Neate, Lieut. R.G.A.



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To what extent can Infantry rely on Artillery to support its attack?

Translated from "Le Spectateur Militaire."

(Continued from "Translations," October, 1910, page 104).

1st September, 1910.

In the campaign of 1866, the artillery on both sides had to change their tactics and take precautions under fire to avoid being silenced. The heavy loss sustained by five Prussian batteries at Nachod, showed the necessity of taking cover. The result of the 1870 war was the employment of the whole of the artillery from the commencemest of the struggle.

The introduction of Q.F. guns and of new laying appliances under cover allowed artillery to engage a superior force. and it was thus possible to economise forces. The Russo-Japanese war shews that indirect fire will be the general rule. At the Yalu, the Japanese guns were in pits. hidden by brushwood, the Russians, as in good old days, in very visible gun-pits on the crest. The Japanese silenced the Russians at a range of 4,300 yards and next day almost annihilated them, thus preparing the way for the infantry attack.

At Wafango the Japanese posted two reconnoitring or decoy batteries in the open, on which the Russians opened, thus disclosing their position. Later on 12 Japanese batteries surprised 3 Russian batteries who lost heavily. This action covered the movement of the whole Japanese army. The next day 17 Japanese batteries overwhelmed the Russian position in front and engaged their central position with oblique and enfilade fire. On the Russian retreat, their opponents rapidly occupied the conquered positios, and swept the retreating infantry with a storm of shells. On the left Russian wing 13 guns were abandoned, and the victory was due to the energy and decision of the Japanese artillery.

These defeats caused the Russians to change their tactics; they hid their guns behind the crest, sometimes using false emplacements to deceive the enemy.

At Liao-Yang the artillery duel was indecisive and the Japanese infantry could not advance.

At the Sha-Ho the day and night bombardment was waste of ammunition, and was of no use to infantry and quite contrary to the spirit of co-operation.

At Mukden the long cannonades had no useful result.

Against the railway redoubt and Hanchoupou the bombardment lasted three days and two nights, the attack finally succeeding owing to a thick curtain of dust and smoke.

The conclusions to be drawn are as follows:—

1. The uselessness of long duels by guns under cover, with no advantage to the infantry.

2. Guns under cover can not only engage the enemy's guns, but also his infantry, under certain conditions.

3. When the dead ground in front of crest is too great, the artillery must advance and endanger itself in support of its infantry. This, however, rarely happened, and the two artilleries often showed excessive prudence, thus leaving the two infantries at loggerheads and rendering the Japanese assaults very indecisive.

4. The impossibility of batteries actually accompanying infantry under fire.

5. It is possible for shielded artillery to fire on occasions impossible if unprotected. One ready-made shield caused a Russian battery only six casualties during the day. So deep was the conviction of the harmlessness of the enemy's fire, that talking and joking was indulged in during the bursting of the enemy's shells, and no one thought of entrenching.

6. The impossibility of changing position in certain ground by daylight.

To sum up, "infantry batteries must choose their ground with the greatest care, under cover for choice, with due regard to the tactical end.

Even when behind cover, they run the risk of being seen, and put "hors de combat" by hostile batteries completely hidden. Shields reduce this risk, except from percussion shell, direct hits being, however, very unusual. Batteries are too fond of cannonading each other and leaving the infantry untouched. They also make the mistake of choosing their position before the infantry become engaged. If they accompany the attack they run risk of losing their teams, the shields being now useless, and they must await nightfall before advancing to effective range.

Owing to the difficulty of pointing out targets, artillery and infantry must try and see objects with the same eyes. This will be difficult if, owing to casualties, the guns have to be served by reservists or Territorials. Q.F. results depend entirely on the personnel.

In peace everything must be practised till it becomes virtually automatic. In default of experience, do the regulations afford the means of learning the practice

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of modern tactics That is what every artilleryman must know.

These endless contradictory instructions, with so many interpretations, are stumbling blocks even to the studious, and are apt to persuade them that they will never learn their profession.

The regulations of the two arms should present not only a treatise on tactics, but above all simple and precise rules for the conduct of a fight, which can be put into immediate operation. Failing this, what would be the result in actual warfare?

Instead of the calm and systematic conduct of fire, after thorough reconnaissance, hand-in-hand with perfect co-operation with the other arms, one would see artillery throwing shells on the wrong objective, with much noise and expenditure of ammunition, but little result. The infantry would thus not obtain the support they have a right to expect from their comrades.

15th September, 1910.

Artillery cannot neutralise hostile guns and rifles, nor can it eject the enemy from his position.

Taking into account its difficulties, artillery will at times be powerful, at times quite useless.

The infantry batteries must concentrate their fire on those "points d'appui," which, if won, would lead to the downfall of the whole position.

The effect of artillery on a strong defensive position is more moral than real.

General Blume considers that infantry deeply entrenched is safe from artillery fire till they raise their heads to fire. Earthworks with a gentle interior slope give a little protection from horizontal fire, but not from plunging. Plunging fire from guns can pierce even blinded trenches, if their position can be exactly determined. Buildings or walls protect from horizontal, but not from plunging fire. They are liable to catch fire and become untenable. Heavy artillery can, with copious expenditure of ammunition, obtain good results. "Artillery alone cannot dislodge defenders gifted with strong morale."

Threatened by the attack and the infantry advance, the defenders will reply to them as follows.

(1) some will try to aim; (2) more will fire into space; (3) others completely under cover, except the head, will fire with rifle resting on the ground.

In this case the men press the trigger with one hand the palm of the other pressed against the butt, to counteract the recoil. This was tried; the rifle recoiled but little, the shots were grazing and gave better results than those fired in the air.

(4) some fire in Boer-like trenches, absolutely out of danger; (5) others through loop-holes, &c.

In the other sections of the defence, untouched by artillery fire, the defenders' fire will be more effective.

The improvements and longer range of fire-arms has favoured the attack, which can choose the right time and place, while the defence must scatter its fire over a wide front. At the same time the power of the attack is apt to be overrated. Once a fire has reached a certain standard of effect, the concentration of batteries does not materially increase it, and does not shew any marked superiority over guns completely under cover. Many artillerymen even think that one Q.F. battery is enough, if it can cover a front of 110 to 220 yards. The defence, on the other hand, strengthened by shields and guns under cover, has always some of its power in reserve. The attack must seek superiority of fire, not by concentration of batteries, but by enveloping movements.

Napoleon remarks that guns must attack the enemy obliquely, by enfilade or enveloping tactics. If this principle cannot be applied, the infantry cannot enter into the dangerous zone without heavy losses and many sets-back.

We are far from being able to march, free from anxiety, under the protecting wing of our artillery, far also from realising the ideal of the new Q.F. guns which were to sweep the enemy's infantry from the battlefield.

In Manchuria the two artilleries have often neutralised each other and left the infantry at loggerheads.

In our advance we must rely on ourselves rather than our guns, using cover like a protecting shield and using such formations as will enable us to put the maximum of rifles in the firing line.

We cannot avoid loss, which will be greatest from small arms, which can be fired mechanically, so to speak, without all the paraphernalia of artillery.

In the Russo-Japanese war the losses were:—

7% from bayonet.
8% ,, artillery.
85% ,, infantry.

These figures are taken from Japanese casualties at Mukden.

CHAPTER II.

The support on which infantry can rely from the moment when guns have to increase their elevation.

At this time the defender's front line escapes somewhat. This subject is divided into:—

1. The diminution of artillery support owing to increased range.

2. The rôle of machine guns in supporting the attack. At what distance between the infantry and the enemy's position must the guns increase their range for safety?

In 1870 the infantry lost artillery support at the critical moment, as at Worth all our attacks were repulsed. At the long bombardment of Plevna the infantry were hidden and suffered no loss. Skobeleff succeeded because his guns accompanied the infantry assault.

In the Boer war the artillery with some exceptions kept to the old procedure and deserted their infantry, who were often driven back. At Colenso the guns bom-

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barded the position for two days; the Boers let this storm pass and then drove back the British infantry at 900 yards range. At Magersfontein also, after two days shelling of the Boer position, the infantry advanced unsupported and fell a victim to the Boer rifles.

In the early battles the Russians fell into their old mistakes, but soon learned a lesson from the Japanese.

Present day tactics recognise the value of co-operation and only differ as to the distance infantry can approach the enemy's position, while supported by artillery. Everyone admits that fire over friendly troops is necessary, as long as they are out of danger, and are not harassed by the noise of the shell in flight. The trajectory should pass not less than 12 yards over their heads.

Infantry must not approach nearer than 430 to 540 yards from the enemy's position, while still supported by gun fire. General Rohne puts the distance at 220 to 330 yards. In these cases the artillery fire should if possible be oblique or enfilade. If the range is well found, and observation easy, or on rising ground, this distance may be much less. It is safer to use percussion shell.

This business is greatly a matter of chance, for the line to be engaged cannot often be accurately defined.

In the attack of a wood or village, the defenders may be at the edge, in front, or on a flank, and all these places have a difficult range. As so much depends on the difficult art of co-operation, one may agree that a distance of 540 yards will be the minimum.

It is easy to talk of risking loss from one's own shells, but after all what can be more mortifying than to see troops caught between two fires Firing over one's own troops is a dangerous game, but inevitable.

Edward P. Smith, Major, R.F.A.

Revue Militaires des Armées Etrangères

June, July and August, 1910.

June, 1910.

The Swedish army in 1910.

This article, which is to be continued, contains nothing of peculiar interest.

Military News:—

Austro-Hungary. Permanent cyclist companies are to be created. The schools for field, mountain and fortress artillery are to be re-organised.

Belgium is experimenting with portable quick firers.

An entire German division including cavalry and artillery is to be clothed in a new service dress during the Imperial manœuvres of 1910.

The American army began its re-organisation on May 1st 1910. The country has been divided into eight field army districts. The re-organisation of the 1st army of three divisions with Head-quarters at New York is rescribed.

The annual report of the War minister gives the effective strength inclusive of the Phillipine Scouts as 4,366 officers and 77,412 men showing an increase of 136 officers and 3,476 men since last year.

There are many officers seconded from their units and the number is on the increase It is impossible to reduce them. On 30 June, 1909, more than half the companies of the regular army were without their captains. The only remedy is an increase of the establishment of officers. In spite of special efforts the number of deserters has increased to 5,000.

The increase is said to be due to the conditions of civil labor in the last two years for most of the deserters are young soldiers. It is proposed not to return deserters to the ranks of the army on the conclusion of their term of punishment. Discipline is reported to have suffered to some extent by the abscence of company commanders but crime is in no sense on the increase.

The steps taken last year by President Roosevelt, to ensure officers keeping themselves fit having not proved successful, in addition to the annual test in horsemanship and marching there will now be a weekly obligation to ride and walk a certain number of miles.

The commission on infantry equipment recommends something quite new—a long havresack that reaches the ground when the man is seated and thus relieves his shoulders of the weight, cartridges in cartridge belts fitting into the waistbelt and which can be left on the ground after being emptied. Camp equipment of aluminium and a modified portable entrenching tool.

The results of the artillery and musketry shooting are said to be surprising.—The United States has 78 rifle clubs with 3,300 members. For reasons of economy no credits are being taken in the budget for aeroplanes or dirigibles. The report of the judge advocate general again draws the attention of the War Minister to the disadvantages incurred by the interdict against the sale of alcohol and beer in regimental canteens. Such beverages are sold by houses situated in the neighbourhood of barracks but outside the control of the military authorities. Last year crimes due to drink were 493 in number; this year the total of them is 657.

This (June) number comprises an index for the six months ending June, 1910.

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July, 1910.

The German Budget of 1910.

Part I. describes the financial state of Germany at the commencement of 1910.

The problem of adjusting expenditure to income has to be faced but that the Government does so with confidence is evident, from the fact that it has recently increased the pay of officers and N.C.O's of the Army.

The discussion of the budget has so far only been on general lines but the following points are of interest. The socialist party have attacked the arbitrary power of the military cabinet more passionately than ever regarding the favorable conditions of the nobility among officers on the active list. Instances were quoted of 15 cavalry regiments, 12 infantry regiments and two regiments of artillery which do not contain a single officer who is not a noble and it was stated that these privileged regiments are stationed in the best garrisons in the Empire.

The late War Minister General von Giuem, said in 1909, that a remedy must be found for this state of things. It would be detrimental to the army if an idea got about that there were first and second class regiments. The present state of things is of recent growth for a long list of regiments can be made which containing to-day only officers of noble birth, lost in 1813-15 and 1866-70 many officers of bourgeois birth. This year General von Heeringen has attributed the existence of regiments officered by nobles to the tradition in Prussian noble families for son to succeed father in certain regiments. His own three sons serving in the regiment in which his great grandfather and himself had served was an example he quoted. This discussion took place in January and February last; and in March last, in distributing 59 cadets nominated for Lieutenancies many of bourgeois birth were posted to regiments which have never contained an officer of other than noble birth. Notably two regiments of the guard.

Deputies of the Reichstag of different parties agreed in condemning the excessive luxury of the one year volunteers. In certain cavalry regiments it was notorious that they required an income of £40 a month. From the discussion that took place it appears that one year volunteers are being regarded with disfavour; their military preparation is not sufficient to assure good recruiting for the establishment of reserve officers. The War minister stated in reply that the suppression of the one year volunteers who numbered 12,000 in 1910, would prejudicially affect the recruiting for the reserve cadres and would lead to the expenditure of a million and a half sterling in order to maintain the peace effective.

The budget provides for an increase of 360 N.C.O's. This is severely criticised on account of the failure of the civil government of the Empire to provide N.C.O's with employment on quitting the colours. Since January 1st 1909, the Prussian government railways have not found employment for a single military applicant.

The compulsory retirement of officers owing to supersession by their juniors has increased the pension list since 1872, from £1,040,000 to £5,940,000.

The shortage of officers is chiefly among lieutenants of infantry, being some 700 in 1910 compared with 900 in 1909.

The strength of army doctors is increasingly deficient in spite of the increased pay given last year.

The Swedish Army. Part II. command and administration.

Military News:—

Germany. It appears from the Dienstaltersliste seniority list (1910) of the Prussian army that the service in each rank of infantry, cavalry and field artillery officers is as follows:—

Sub-Lieutenants and Lieutenants	17 yrs.
Captain	12 ,,
Major	7 ,,
Lieut.-Colonel	3 ,,
Colonel	4 ,,
Major-General	3 ,,
Lieut.-General	4 ,,

The oldest captain of the Prussian army was commissioned in February, 1884. But on the staff there is a certain number of majors commissioned in 1890. These officers have gained one or two years seniority by exchanging as captains into corps where there are no senior officers. Again Captains of the staff are on a separate list for promotion to Major and there are more Majors employed on the staff than Captains compared with other branches of the German army.

Field Artillery practice.

The most important of certain changes under trial is the abolition of the half concealed position (fast verdeckte stelling). In future the artillery regulations will only recognize concealed and open positions.

In concealed positions the proposed regulation distinguishes between positions close up to cover (rand stelling), and positions for long range fire. In either case personnel and materiel must be completely concealed.

At first sight there does not appear to be much difference between the new "Rand stelling" and the old "fast verdeckte stelling," except that the former requires a more marked displacement (with regard to cover).

This would be however to look at the question quite superficially. The chief characteristic of the half concealed position was that each gun was laid on the object or on an auxiliary aiming point. When the target was changed, the sight and corrector were set at zero and the gun re-layed as before. In short, to use the French expression, the half concealed battery "used indirect fire with independent laying by each gun."

On the other hand, laying from "rand stolling" (masked positions in proximity to cover), will be carried out on the same principles as from guns in a concealed

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position either by placing the guns parallel to a base gun which will be the most usual method or by laying them on an aiming point common to the whole battery. Changes of target will be carried out by means of a table of angles.

The regulations regarding batteries in a position of readiness are also modified. At present the battery only occupies its position at the moment of opening fire; in future it will come into action at the exact spot, the guns ready layed and ready to open fire. These contemplated changes in field artillery practice, are not limited to amending the methods of fire from concealed positions, they tend to make the employment of such fire more general: showing on the one hand, the advantages of fire positions which, being a long way behind cover, "compel the enemy to distribute his fire, aiming at economizing much ammunition to obtain a less result, and on the other, insisting upon the disadvantages and even danger of open positions. This constitutes an approach to the French outlook on this subject as well as in methods of fire.

A new observation carriage has been adopted and is being issued. It consists of a wagon body and limber drawn by four horses in peace; in war, the limber being filled with ammunition six horses are required.

The body is made to afford cover to the battery or group commander in a position of observation. The director, battery telescopes, etc., are carried in it and before action, are taken out of the carriage and fixed to the saddles of the communication orderlies of the battery, or group commander.

The field artillery observation wagon also carries a ladder which affords cover by means of removable shields to its occupant for whom a seat is also provided with the telescope fixed to the ladder.

August, 1910.

The Budget of the German Empire, 1910.

The only noteworthy point is that the brigade staffs and batteries will receive the observation wagon during the financial year, 1910-11.

Military News:—

German Empire. It is announced in the press that during the imperial manœuvres of 1910, some of the pioneer battalions will be supplied with two natures of search lights, one light the other heavy.

The light one can be carried on the man's back and has a range of 450 yards and will serve to light the ground in front of skirmishers; the heavy one is carried in vehicles and has a range of 1,600 yards.

U.S.A. The methods of ranging employed by the coast artillery of this army are described as being very different to those of the French. They try for a "lucky hit" without employing a bracket.

Practice from mortars has made considerable progress; the percentage of hits on the target having increased from 14·7 in 1907, to 29·4 in 1908.

The chief of the ordnance professes to have found a metal for rifle bullets which will obviate the wear of the rifle barrel. The metal of the existing bullet amalgamates with the steel of the barrel and wear is considerably increased by the subsequent cleaning.

To reduce the wear in big guns the authorities propose to exercise greater care in the manufacture of inner tubes, to widen the driving band and to employ a powder of nitro-cellulose base, with a view to lowering the temperature of explosion. Coast defence guns of six calibres and upwards, mortars excepted, will be made with two concentric tubes in order to render the renewal of the worn inner tube less costly and to double the life of the gun.

A grenade fired from an infantry rifle, has been found to give satisfactory results during some recent experiments.

R. H. Hare, Major, R.A.

Kriegstechnische Zeitschrift

April, 1910.

1. Tactical and Technical notes on Infantry rangefinders (continued)..

Rangefinders are especially necessary for machine guns. The author gives a calculation showing that by their use the average number of hits is quadrupled at ranges between 650 and 1,100 metres. At long ranges, up to 1,800 metres, this proportion is still further increased.

2. The cost of our Fortresses (Frobenius).

After 1870-71, it became necessary to strengthen the frontier fortresses, including Metz, Strasburg, Cologne, Konigsberg, Thorn, and Posen. No sooner had this been done than the introduction of high-explosive shell rendered it necessary to re-construct the works with concrete and armour plates. More recently they have had to be re-armed with modern guns. Up to 1908, the cost of this has amounted to 37¾ millions sterling.

This is much less than the sum spent by the French on fortifications during the same period. The author gives details of the cost of concrete works, excavations, armour, etc., per metre of perimeter.

3. The new German war balloon M. III.

The details of this dirigible are given. It is 84 metres long, greatest diameter 12·4 metres, capacity 6,500 metres, and is driven by four Koerting motors each of 75 h-p. The propellors are 5 metres in diametre and are set on either side of the

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car; they revolve comparatively slowly, namely, at 300 revolutions per minute.

The balloon is of the semi-rigid type with framework in three parts, jointed together; the framework is of aluminium tubes, the car of steel tubes. Twelve men can be carried, but the normal crew consists of seven only. The balloon carries a wireless installation and is fitted with appliances for dropping shells. The crew are armed with rifles.

4. Field fortifications in France.

This is a continuation of the review of Captain Bastien's book, and deals with the second and tactical part. This is criticized in great detail. Generally, the critic considers that the author's dispositions are complicated and over-centralized, every detail being ordered from head-quarters; this method would break down in war.

5. The Parseval non-rigid airship.

This balloon is stiffened by interior air-chambers or "balloonettes," which are pumped up to prevent the envelope from collapsing under the air-pressure when moving at speed, or when a loss of gas is experienced. The balloonettes also serve for vertical steering since the axis of the balloon can be inclined upwards or downwards by adjusting the quantity of air pumped into the balloonettes at the two ends.

The car is not rigidly connected to the balloon but has a swinging suspension.

The largest Parseval dirigible yet constructed was exhibited at Frankfort in 1909. It was of 6,500 cubic metres capacity, driven by two A.E.G. motors, each of 100 h-p., which enabled it to attain a velocity of 30 miles an hour. It had two screws each 4 metres in diameter, capable of working forwards or backwards. During the summer of 1909, this airship was 145 hours in the air, and travelled about 3,500 miles. It is now to be handed over to the military authorities.

6. The Bayer submarine.

An account of a somewhat fanciful invention. The boat is shaped like a water melon with a smaller cylindrical body attached to it by a bridle; when on the surface the melon rolls on the water; when submerged it is towed by the cylinder, which is fitted with a screw propeller. The idea does not appear to be of practical value.

May, 1910.

1. New Krupp Siege Mortar.

This is a two inch howitzer throwing a 15-inch spherical shell. The shell is placed on the muzzle and is propelled by a rod which projects down the bore. The howitzer and bed weigh only 12 cwt., while the shell weighs 187 lb. The charge is only six ounces of powder, which is sufficient to carry the shell 350 yards at 80° elevation. Longer ranges are obtained by giving reduced elevation down to 43°. The mortar is intended principally for the support of the assault from the 3rd parallel.

2. The cost of our Fortresses; by Col. Frobenius (conclusion).

It has been contended that the cost of a fortress may be reduced by the use of guns in armoured turrets, since a smaller number of guns will then suffice. The author discusses this question in great detail, and concludes that, generally speaking, no reduction of cost will be possible. He is in favour of the use of armoured howitzer batteries, which combine cheapness with efficiency.

3. The Development of Naval Ordnance.

A popular historical article tracing the development of the naval gun from the smooth-bore to the quick-firer.

4. The Mono-rail; its application in war and in the colonies (illustrated).

The German Scherl system is similar in principle to the Brennan. With both systems, the author considers that the only possible motive power is electricity, supplied from an overhead wire. The mono-rail system is more liable to breakdowns than the ordinary double rail, and in an enemy's country the overhead wires would be very liable to be cut. For light narrow-gauge railways the mono-rail has no advantages as regards quickness and ease of construction over the ordinary field railway. For colonial railways, the supply of electric power will be the principle difficulty. It will be advisable to run the cars partly on accumulators, which will enable the power stations to be placed further apart.

5. Automatic illumination of the foreground.

Experiments have been carried out with fireworks containing ½ lb. of illuminating composition, set 20 metres apart, and connected by a wire, so that any man walking up against the wire ignites the fireworks. The effect was to give a brilliant illumination lasting ½ minute. When a truss of straw was placed on top of each firework, the illumination lasted four minutes.

6. The Russian flying field tramways used in Manchuria, 1904-05.

The Manchurian roads are very bad, and transport of supplies was difficult. On the outbreak of war, about 100 miles of light field railway and 652 trucks were available at Lubin, in Russia. This was despatched to Liao Yang, where it arrived by the 15th of July. On the retreat from Liao Yang, most of the materiel was abandoned. Three lines had been commenced, and were used principally for the transport of guns from the ordnance park to the defences.

No engines being available, the trucks were drawn by horses purchased in the country. These lines were found most useful. Similar lines were laid at Mukden and at Sipinghai, on the Sha Ho.

7. Improved differential recoil gear.

In differential recoil guns, the gun recoils at each round to the loading position, where it is held by a catch, loaded, layed, released, and fired when in

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forward motion by a tripper which actuates the firing gear. The distance to which the gun recoils naturally varies, being greater at high elevations. This requires the position of the catch to be shifted, which is inconvenient. The inventor gets over the difficulty by automatically shifting the tripper forward as the elevation is increased, thus getting a longer run and greater forward velocity, which reduces the recoil to compensate for the increase due to the weight of the gun at high elevations. The effect is that the gun always recoils to the same point.

For howitzers the position of the tripper can be shifted for different charges, in addition to the automatic correction for elevation.

8. Contents of Magazines, and Reviews.

June, 1910.

1. The Military employment of Aeroplanes.

For distant reconnaissance, the aeroplane will be carried suspended from a dirigible balloon. When important information has been obtained, it will be sent back with despatches while the dirigible remains in observation. For short distance reconnaissance the aeroplane will be used alone. It will certainly encounter hostile aeroplanes, and in order to cope with these it must carry a machine gun. In any case the aeroplane must carry two men, one to work it and the other to observe.

Experiments have shown that it is difficult to drop explosives from an aeroplane with any accuracy.

The principal requirement to be aimed at in construction is reliability. The aeroplane must therefore have two motors in case one breaks down. A gyroscopic balancing appliance is urgently required. Such a device has been invented by Captain Renard, in France, and is said to weigh from 40 to 60 lb. with electric motor complete.

Records of height and distances achieved are given, and the article concludes with a summary of the progress of aviation in different countries.

2. On the means of improving the judging of distance in the infantry combat.

The author proposes to insert in the field of the telescope or binoculars two vertical lines at a distance apart corresponding to the breadth of one man (20 inches) at 100 metres. Then if 10 men in close formation can be counted between the lines, the range is 1,000 metres.

3. The progress of Naval armaments.

A popular history of the development of battleships, guns and torpedoes from the period of iron armour up to 1870.

4. German aeroplane motors.

A brief description of the Daimler and Koerting motors.

5. The Russian horse-tramways in Manchuria (conclusion).

The article gives technical details as to the amount of excavations required per mile, the gradients, transport capacity, and organisation.

6. Military notes.

The Austrian mountain howitzer. The French cavalry carbine. A French light field telescope. Field telegraphs in France.—Light metal and light gas. The metal is an alloy of aluminium and magnesium, said to be lighter and stronger than pure aluminium. The gas is decarburetted illuminating gas (coal gas) containing over 80% by volume of hydrogen, and has a specific gravity of 0·225 against 0·41 for coal gas and 0·0696 for hydrogen.—Macarite, the explosive used in the Belgian army. This is said to contain T.N.T.—The Roessler air-ship. This is a rigid air-ship divided into three parts connected by flexible joints.—Armament of the Russian gunner. The men working in the detachment are now to carry sword-bayonet and revolver, all others sword-bayonet and carbine.—Increased proportion of entrenching tools carried in the Russian infantry. In future each company is to carry 140 small spades, 30 hatchets, and 30 picks, so that each man will carry a tool.

Cyclist troops in Italy. The Bersaglieri are to consist, as before, of 12 regiments of three battalions, but each battalion will have three companies instead of four. Of the 36 surplus companies, 12 are to be formed into four independent Bersaglieri cyclist battalions of three companies. The remainder go to the reserves.

July, 1910

1. The Fontana Mast as a Field Observatory.

This mast consists of four or six long flexible strips of metal, wound on drums. They are wound off the drums together to form the four or six sides of the mast. As they are wound off a series of binding plates are automatically slipped over them to hold them together. The mast can thus be wound up to any desired height up to the full length of the strips. A mast 26½ feet high with seat and all gear weight three cwt., and packs into a space 3′×3′×2′.

2. A new signalling apparatus.

This is similar in principle to the Dietz disc. It has four leaves of different colours on a vertical spindle, forming a sort of book which can be opened in different ways to show different signals. It is used with a special code.

3. German Airship motors.

A description of the Koerting motors. These are stated to be highly efficient, but no constructional details of interest are given.

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4. The accurate measurement of bullet velocities by spark photography.

The bullet is fired so as to pass successively between the terminals of four Leyden jars, without touching them. As the bullet passes each pair of terminals it bridges the gap and causes a spark to pass at another point of the circuit. The image of this spark is thrown by a lens on a rapidly revolving cylinder coated with a photographic film. The distance apart of the spots on the film enables the velocity of the bullet between one pair of terminals and the next to be measured with great accuracy.

5. The development of Naval Armaments. (Continued).

This instalment deals with the introduction of anti-torpedo-boat guns, of steel armour, and the alteration in the type of ship resulting therefrom, up to the Dreadnought period.

Military Notes.—An instep strap to improve the fit of the German Wellington boot.—The Mexican automatic rifle.—The Russian rifle in Manchuria. The powder is stated to have been bad, causing much fouling. The sights slipped down from round to round. The steel loading clips soon became rusty and could not be inserted, and single loading had to be resorted to. The long slender bayonet was weak and liable to bend.—Armament of the French cavalry. This is at present very heavy; a new light carbine is being issued and the heavy sabre is to be replaced by a triangular rapier for thrusting only.—A new sword carrier.—The sterilization of water by electric light. The ultra-violet rays form a mercury-vapour electric lamp, and have the property of destroying germs. With a lamp of 4 ampères and 135 volts placed in a barrel, 6 cubic feet of water can be sterilized in from one to two minutes.—The Schütte air-ship. This is a torpedo-shaped rigid balloon with frame of wood instead of metal.—Kite photography. This will enable a besieger to get a photograph from above the defences of a fortress.—A compressed air gun for throwing a life-saving line.—Signalling lamp with coloured glasses.

August, 1910.

1. The Coast Defences of Italy. By W. Stavenbagen.

A brief description of the Italian coast line and its defences, including a summary of the land and sea forces and description of the railway system.

2. The value of the Sapper in War.

There was a period in the history of the German army when the Engineer officer did nothing but build forts and look after barracks. Constant attention to drains, smoky chimneys, and broken windows sapped his military ardour, and he almost forgot that he was a soldier. This is now changed; the Engineer is no longer a barrack-master, and he has little to do in the way of building forts. He is a field engineer, and field works and field entrenchments engage his attention in peace and war. The author goes on to complain of the way the field companies are starved in peace time, with insufficient carriages and no regular teams, so that only a part of each company, with hired horses, can turn out to manœuvres.

3. Performance of the German rifle in peace and war.

A technical article on the ballistics of the German infantry rifle with S. bullet, which is compared to the French D bullet and the new Spanish pointed bullet. Up to 1000 metres the last-named shows a marked superiority.

4. Hand grenades (illustrated).

A historical article tracing the development of the hand grenade from the Orsini bomb. For modern use the author recommends a grenade of aluminium and zinc alloy, loaded with picric acid or dynamite, and exploded by a direct-action fuze. It weighs about 1 kilogramme and is thrown by a handle in the form of an iron ring attached to its base.

5. Field fortifications at Melilla.

The Spanish forces in the field were at first very small, and field entrenchments were freely used to strengthen their positions. A map of the defensive lines, and the plan of a field redoubt, are given.

6. Military Notes.

New German bridging material. This consists of galvanized steel pontoons, steel wire ropes, and improved pontoon wagons.—Mining manœuvres. These were on a small scale, and consisted of a subterranean attack on the fortress of Mayence.—German airship manœuvres. These were carried out at Metz in July and August, in favourable weather. Three military dirigibles, Z I., P II., and M II., took part in them. The behaviour of the airships was perfect, and the results were entirely satisfactory.—Military aviation in France. In consequence of the results achieved at manœuvres in aeroplane reconnaissance, the French have decided to form an Army Aviation Corps on a large scale. Three schools of military aviation already exist at Vincennes, Satory and Chalons, and three more are to be be formed at Sissons, Reims-Betheny, and in the Alpes Maritimes. A credit of £80,000 for the year 1911 will be demanded for this purpose. A competition is to be

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held to select the best type of military aeroplane; this must be capable of carrying three persons with fuel for 120 miles. It must be capable of being readily folded up for transport.—A new projectile for use against balloons. This is a wooden hand grenade intended to be dropped by an aeroplane on the upper surface of the balloon.—Military mechanical transport in Italy. The Italian Government have decided to purchase 600 motor lorries for the army, at a total cost of £240,000, or £400 each. —The American 14-inch naval gun. This is now under trial. It weighs 63 tons and fires a 1400lb. shell.—A new rifle sight. This has a triangular foresight and trapezoidal notch.

H. A. Bethell, Bt.-Colonel, R.F.A.

The Co-operation of Field Artillery with Infantry in 1870-71, and at the present time.

By Major General Blauel.

Translated from "Militar Wochenblatt" No .119 of 22nd September, 1910.

This article is interesting in that it shows the extraordinary conservativism of Germans on the subject of field artillery. The whole aim and object of the article is to criticize the policy of covered positions and the employment of indirect fire and to advocate a return to crest positions and direct fire.

The author commences by praising the conduct of the German artillery in the 1870-71 war, and especially the action of commanders on frequent occasions of pushing forward into, and occasionally beyond, the infantry firing line.

He considers the present tactics a retrogression on those of 1870, a going back to the tactics of withdrawn positions for artillery that were found to be disastrous in 1866.

In advocating his theory he argues:—

1. That because the artillery are protected by shields they should expose themselves as freely as the infantry are obliged to do, and that it is unfair on the infantry that they should seek additional cover from ground.

2. That although in peace indirect fire may equal direct fire in effect, that effect, even in peace, will never be obtained as quickly under modern war conditions, especially when higher control has been lost and everything depends on the initiative of subordinate commanders. Artillery in covered positions may find itself in a position of great embarassment and will not be able to afford timely support to the infantry depending on them.

3. The delay in moving from a covered to a direct fire position, and the fact that when obliged to move forward to give close support to infantry the loss will be greater and the fire less efficient than if the batteries had occupied an open position from the first.

4. That the accomplishment of any given fire effect will require more ammunition from a covered than from an open position.

The writer goes on to suggest that covered positions should not be allowed at manœuvres, and says that the selection of a covered position is so easy compared with that of a commanding position that no special training is required for it. "A battery which can skilfully find and occupy a crest (Rand) position for fire with telescopic sights will always be well able to occupy a covered position."

These arguments can easily be answered. but the article throws a curious light on German artillery conservativism.

R. M. B. F. Kelly, D.S.O., Col., R.A.

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The Technique of Artillery Command

(Führungstechnik der Artillerie).

Field and Heavy Artillery in Field Warfare.

By Major General Hoehn, Comdg. 1st Brigade, Bavarian Field Arty.

TRANSLATED FOR THE GENERAL STAFF BY COLONEL H. A. BETHELL, R.F.A.

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MEANING AND VALUE OF THE TECHNIQUE OF COMMAND.

1. Every act of military command has an essential and formal side. The essence of the act is the result of an intellectual process culminating in a decision. The form of the act includes the expression of the decision in orderly sequence, its communication to others, and the supervision of its execution. The form involves the skilful handling of a number of matters of practical importance, and, for want of a better word, will be styled the *technique of command.*

2. A sound technique of command is absolutely necessary in every army to prevent the recurrence of friction, omissions, misunderstandings, errors, doubts, hesitations, and delays, which even at manœuvre, often nullify the effect of sound and vigorous decisions. Moreover in war an established routine of technique of command is valuable in that it automatically assists to overcome the mental disturbance due to war conditions and to the effect of the enemy's fire, and many other difficulties which arise in the field. This much is certain, that if two opponents are equal as regards soundness and energy of decision, then the deciding factor will be superiority of technique. In fact, superior technique may make amends for less perfect decision, since in war the manner in which a thing is actually done is much more important that the manner in which it was intended to be done.

3. Unlike the intellectual qualities of leadership, skill in the technique of command may be acquired by training and self-discipline. Failures due to defective technique must be ascribed to culpable negligence. But this furnishes the author's justification for writing a book on the technique of command; the more so that this subject finds no place in the Regulations. For these must avoid going into details which are immaterial in themselves, and which serve only one purpose, namely to ensure the correct and punctual execution of the commanders decision.

The present book must, therefore, be considered only as a compilation, dealing with two matters. In the first place, it contains recommendations as to the methods to be adopted, concerning which another author might differ from the writer's views. In the second place, the book deals with the things to be remembered; this part is only intended to show what the officer must bear in mind, not necessarily what he is to embody in orders.

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THE ARTILLERY OF THE FIELD ARMY.

4. In field operations, the *field artillery* always form the bulk of the artillery. Field artillery is indispensable, and produces the principal artillery effect. *Heavy field artillery* serves to supplement the action of field artillery. Its duties are so closely connected with those of the field artillery, and overlaps them to such an extent, that it is absolutely necessary to place it under the commander of the latter force, who then becomes the *artillery commander*. It would reduce the efficiency of the artillery as a whole if the commander of the troops were to attempt to assign separate duties to the commanders of the field and of the heavy artillery.

5. In the German army the *field artillery* is exclusively *divisional artillery*; that is, all the batteries belong either to the infantry division or to the cavalry division. The normal war organization does not include *corps artillery* under the immediate command of the officer commanding the troops. But he is at liberty, in special cases, to form a reserve of part of the divisional artillery; this reserve thus constitutes a species of corps artillery.

6. The *heavy artillery* usually consists of one battalion of heavy field howitzers[1] to each army corps, under the immediate command of the General Officer Commanding. But for administrative purposes—that is, for marching, camping, and supply—it will be desirable to attach the heavy artillery to one of the divisions. The same applies with even greater force to heavy artillery in the combat, since the General Officer Commanding, as a rule, has not any field artillery under his immediate command, and the only object of the heavy artillery is to supplement the fire of the field artillery. The exceptional case is when the General Officer Commanding has formed an artillery reserve. When not fighting, it is immaterial to which division the heavy artillery is attached; but, in action, this is determined by tactical considerations. Whenever artillery is attached, it must be clearly stated whether the attachment is for tactical or for administrative purposes.

In situations of *encounter*, if the army corps is marching in a single column, the heavy artillery is given to the leading division. If the divisions are marching abreast, it is given to the division which will most probably require reinforcement. The allotment of the heavy artillery must be carried out in good time, in order to enable the system of officers' reconnoitring patrols to be arranged for the whole force; that is to say, the heavy artillery should be allotted, if possible, by the time the fighting march commences.

In the *attack on a prepared position*, the heavy artillery is allotted to the division which is to carry out the decisive attack. In this case the decision as to its allotment cannot be formed until the situation has been cleared up by the preliminary fighting.

In the *defence*, the heavy artillery is allotted to the division against which the attack is directed; therefore the direction of this attack must first be determined.

Since both in the preliminary stages of the defence and in the

[1] That is, four batteries of six 5·9″ howitzers. But in Germany the term "howitzers" also includes heavy field guns capable of firing at elevations over 15°.—*Trans.*

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attack on a prepared position the heavy artillery cannot be allotted till the troops are engaged, it may be desirable to keep back the heavy artillery at first as a reserve under the orders of the General Officer Commanding Army Corps.

When the heavy artillery has once been allotted to a division for tactical purposes, it is in all cases desirable immediately to place it under the orders of *the C.R.A. of the division*, otherwise the unity of the whole artillery combat will suffer.

7. The following formations exist only for the supply of ammunition[1]:—

(a). *Light ammunition columns*, one to each Abteilung (of three field batteries) and to each battalion of heavy howitzers. These columns belong to the fighting troops and form part of the Abteilung or battalion. But they march at the rear of the fighting troops.

(b). *Ammunition column Abteilungen* for field and heavy artillery. These are non-combatant corps troops, under the Officer Commanding ammunition columns. When an engagement is in prospect a part of these columns is pushed forward as the *combat echelon* immediately behind the fighting troops, and are allotted to divisions either before the engagement or during its progress.

ARTILLERY COMMAND.[2]

8. The *C.R.A. of a division* during the combat is the senior artillery commander; that is, in an infantry division he is the commander of the artillery brigade, in a cavalry division the commander of the horse artillery Abteilung. As C.R.A. he is immediately under the orders of the General Officer Commanding Troops, and receives his tactical instructions from him; he commands, as a fighting whole, the artillery of the division, including the field artillery and any heavy artillery that may be allotted to it.

9. All other artillery commanders are subordinate to the C.R.A. But the Officer Commanding heavy artillery is in a peculiar position in so far that it is his duty to employ his arm to advantage. In all non-tactical matters (especially ammunition supply) and for non-fighting marches and camping, he is best placed directly under the orders of the General Officer Commanding Troops.

10. The principle, that the senior commander of artillery is the artillery commander, applies invariably and as a matter of course to detached portions of a division, to advanced and rear guards, and to each column in cases where the division marches in several columns. But when the divisions are formed into an army corps, then, in exceptional cases, such as the attack on a prepared position, the senior artillery brigade commander may be entrusted with the collective

[1] Including men, horses, and materiel.—*Trans.*

[2] German organisation:—

1 Brigade	= 2 or 3 Regiments.
1 Regiment	= 2 Abteilungen.
1 Abteilungen	= 3 Batteries.

A Brigade is commanded by a General.
A Regiment is commanded by a Colonel.
An Abteilungen is commanded by a Major.
A Battery is commanded by a Captain.

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command of the whole of the artillery of the army corps, and then becomes the C.R.A. Army Corps. But such a step will normally be taken only in the course of the combat, when the direction and front of the decisive attack have been determined by the preliminary fighting. And this command will then be limited to the portions of the artillery taking part in the decisive attack.

11. As regards their duties, the artillery commanders may be classified as higher and as subordinate commanders. The former see that fire is opened at the right time and on the right targets; they are the "fire controllers." These include the commanders of artillery brigades and regiments. The subordinate commanders carry out the tactical duties assigned to them; their main concern is fire effect. These include the commanders of Abteilungen and battalions of heavy artillery, and the battery commanders.

12. Qualifications of leadership.

DUTIES OF THE SUBORDINATE ARTILLERY STAFF.

13. The subordinate staff is necessary to the commander. As however it possesses only a small permanent nucleus, the remainder being found by the troops,[1] there is a danger of the staff being increased to the detriment of the fighting power of the troops. But the antagonism between the requirements of the staff and of the troops is modified by the fact that the commander requires a strong subordinate staff principally during deployment, while the troops do not require their full strength till they open fire. Therefore there is no objection to the subordinate staff being strong at first if it is afterwards given back to the troops.

Heavy artillery, which has not a sufficient number of mounted men to furnish mounted orderlies, must have cavalry orderlies permanently attached to it by the General Officer Commanding Troops. Thus one battalion of heavy howitzers requires ten cavalry orderlies.

The subordinate staff (other than the permanent staff) is formed as soon as there is a prospect of an engagement; that is, usually at the beginning of a fighting march.

The subordinate staff includes:—

(1). The fighting staff of the commanders of Abteilungen and artillery battalions, and senior commanders.
(2). Battery commanders' staffs.
(3). Reconnoitring patrols and scouts.
(4). Observation and telephone services.
(5). Service of communications, other than the telephone service.

16. The *fighting staffs* of the commanders of artillery brigades, regiments, Abteilungen and battalions serve generally to assist these commanders. They may conveniently be divided into staff officers and subordinates.

The staff officers comprise one adjutant and one or two orderly officers. The adjutant, both in the column of march and in action, should always remain at the point from which orders are issued, even when the commander rides forward. He collects all reports and despatches which arrive, keeps them for reference, and inserts the

[1] In estimating numbers the full war establishment must not be reckoned on; 10% should be deducted for casualties.

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from the most distant ranges onwards. In attack and defence even single batteries may produce great effect if not promptly taken under fire. In encounter events proceed more rapidly, and it will be of less consequence if a hostile battery is not at once located or if a party of infantry is not fired on. In a cavalry action the enemy's artillery may sometimes be neglected, since the principal target is the hostile cavalry, whenever they expose themselves.

This complete combination between artillery and the other arms is only possible by keeping artillery command in the closest touch with that of the whole force and of the other arms.

ARTILLERY COMMAND IN ITS RELATION TO THE COMMAND OF THE ARMY.

22. It is quite impossible for the General Officer Commanding Troops to foresee and order in detail the duties to be performed by the artillery. He can only give general instructions for the combat. Sometimes, as in a cavalry action, even general instructions are out of place. He confines himself, therefore, to informing the C.R.A. as to the situation and the object in view. He keeps him informed of changes in the situation, takes him with him in his reconnaissance, and consults him before forming his decision.

23. The above duties of the General Officer Commanding towards the C.R.A. can only be fulfilled if the latter meets him half-way with intelligent comprehension and support. The General Officer Commanding may expect and require the following of the C.R.A.:—

(a). Assistance in reconnaissance.
(b). Advice as to the employment of the artillery.
(c). Suggestions as to the employment of infantry and cavalry so far as concerns their combined action with artillery.
(d). Suggestions as to ammunition supply.

24. Assistance in reconnaissance implies:—

(a). The C.R.A. must, before the fight, arrange for the artillery reconnaissance on his own initiative; or when, as in an attack on a position, the reconnaissance is organized by the General Officer Commanding, the C.R.A. must undertake the artillery portion of it.
(b). The C.R.A. must accompany the G.O.C. on his reconnaissance or carry out his own reconnaissance under the General Officer Commanding's orders.
(c). During the combat the C.R.A. must send in reports as to the results of the artillery reconnaissances and any other important information.

25. Advice as to the employment of artillery includes:—

(a). Marches: Allotment of guns to advance guard, position of artillery *and of artillery observation wagons* in the column.
(b). Action of the advanced guard artillery when the enemy is encountered; whether it is to be used for an advanced guard action or to be placed at once or later under the command of the C.R.A.
(c). Keeping artillery in readiness; this is especially important in situations of encounter, to avoid delay.

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(d). Reinforcement of artillery, as regards object, extent, place, and time.

(e). Course of the combat. Special attention to be directed to the advantages that may be gained by a change of position.

26. *Suggestions as to the employment of infantry and cavalry.* The primary object of these is to enable or to assist the artillery to support them. Even if it be decided on higher grounds whether the infantry is to attack or to defend or whether the cavalry is to attack, the artillery should have a word to say as to the manner in which this is to be done. In the attack it is especially important that the infantry should not advance till the artillery are ready to open fire, and that the infantry should engage the enemy's position so as to disclose targets for the artillery. In the defence, the situation of the artillery positions will often be a dominant factor in selecting those of the infantry. In the cavalry combat the direction of the attack may be determined by similar considerations. In all situations it may be necessary for the C.R.A. to suggest that certain favourable observation stations should be protected by the infantry and cavalry or even captured from the enemy.

It may occasionally be necessary to offer suggestions as to the protection of the artillery, especially heavy artillery, in flank and rear. Long lines of artillery also require some protection in front to keep off the enemy's patrols.

27. *Suggestions as to ammunition supply* refer to the positions to be taken up by the light ammunition columns and the artillery ammunition columns. It is especially desirable that the commander of the heavy artillery (who in this respect is directly under the General Officer Commanding) should, before the attack on a position, urge the necessity of bringing up an abundant supply of ammunition before the commencement of the decisive attack.

28. The close relations between the G.O.C. and the C.R.A. render continuous personal communication most desirable. Therefore:—

(a). When in camp or billets they should be quartered together.

(b). During the march, until the artillery are ordered to advance, the C.R.A. should ride with the staff of the G.O.C.

(c). During the action the posts of the G.O.C. and C.R.A. should be close together. Since the latter is more liable to be hampered in the choice of his post by the exigencies of command, it may be desirable for the G.O.C. to meet him half-way in in this matter.

ARTILLERY COMMAND IN ITS RELATION TO INFANTRY COMMAND

29. Those portions of the artillery which are detailed for the immediate support of an infantry attack or counter-attack must, to fulfil their duties properly, work in close combination with the infantry. Therefore they must:—

(a). Before the beginning of the attack, find out from the infantry commander how the attack is to be executed and the nature of the artillery support desired.

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(b). During the course of the combat they must keep the front fighting line, both of their own troops and of the enemy, under close observation from advanced observing stations, in order to learn the effect of their fire.

In the defence it is necessary:—

(a). That the artillery subordinate commanders should be in communication with the commanders of the sections to which they are assigned in order that both arms may work together.

(b). That those portions of the artillery which are engaging the enemy's infantry should keep the front fighting line under close observation.

The duty of communicating with the infantry is incumbent, not only on the higher artillery commanders, but also on their subordinates. But these should not wait until communication is established, but must, if necessary, act on their own initiative.

ARTILLERY COMMAND IN ITS RELATION TO CAVALRY COMMAND.

31. In the rapid course of a cavalry combat it is impossible to issue precise and detailed instructions as to the action of the artillery, neither is there time for the artillery commanders to consult with those of the cavalry. Therefore the artillery commanders can only receive general instructions, and must afterwards act on their own initiative. The cavalry commanders must, on their own account, avail themselves of the support of any artillery in their neighbourhood.

ARTILLERY RECONNAISSANCE, SCOUTING, AND OBSERVATION.

General Remarks:—

These serve to gain information about the enemy and about the ground; about the enemy only in so far as he is already deployed or deploying, and about the ground only as regards our own and the enemy's actual or possible positions; all other matters should be left to the cavalry. Further, observation of fire affords information as to the fall and effect of our own shots, and observation of the fighting line affords information as to the immediate course of the combat. But the above does not exclude the necessity of observing and reporting other important matters which may be noticed.

The above duties are carried out by:—

(a). The artillery commander and his staff.

(b). The special personnel, such as the reconnoitring patrols and, in heavy artillery, the observation officers.

Before the combat the work of reconnaissance falls principally on the advanced officers' patrols. To ensure a proper distribution of these, and to prevent overlapping, it is necessary that this service should be organized by the artillery commander.

During the combat, the work of reconnaissance, scouting, and observation falls upon all commanders, who must avail themselves of every means at their disposal. The commanders and their staffs should form the fixed centres, while the patrols and scouts form the mobile element.

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DUTIES OF OFFICERS' PATROLS AND SCOUTS.

(A). BEFORE THE FIRST DEPLOYMENT.

33. The duty of the officers' patrols is a *preparatory* one; they must hasten forward and acquire sufficient information about the enemy and the ground for the general guidance of the General Officer Commanding and the artillery commanders in their subsequent reconnaissance.

In the division, it is usually sufficient if the artillery brigade commander can dispose of one officers' patrol from each artillery regiment and howitzer battalion. One patrol is also required with the advanced guard. Other available patrols are best retained with the brigade commander as a reserve.

The patrols report themselves, at the beginning of the fighting march, to their commander, and, at first, ride with his staff. They receive their orders as soon as the reports of the cavalry reconnaissance come in. On no account are they to be employed to perform the duties of the distant cavalry reconnaissance.

34. In situations of encounter, when the enemy also is advancing, it will not be possible to send out patrols till comparatively late. The object of the reconnaissance is here the line which the C.R.A. hopes to reach with his artillery.

The artillery patrol of the advanced guard will only be sent out on the first encounter; its duty is to discover and inform the officer commanding the artillery of the advanced guard where to come into action in order best to support the infantry.

The C.R.A. will dispose his artillery patrols (usually three in number) so as to cover the ground to be reconnoitred. It will frequently be sufficient to send out one field artillery patrol to the right of the road and one to the left, while the heavy artillery patrol reconnoitres the road and its immediate vicinity. Their duties will be:—

(a). For the field artillery patrols, to discover the best way to support the advanced guard in case this should be engaged. To note the enemy's artillery positions.

(b). For heavy artillery patrols, to locate any positions occupied by the enemy's artillery and to note positions and observing stations for our own artillery.

35. When advancing to attack a prepared position, the artillery patrols may be conveniently embodied in the General Officer Commanding's reconnaissance. The duties will be:—

To locate the enemy's artillery position (especially concealed ones) and observing stations.

To locate the enemy's infantry position, especially the entrenched ones.

To reconnoitre positions and observing stations for our own artillery, and the approaches to them.

36. In the defence of a prepared position, the artillery patrols are sent out into the foreground, but not beyond gun range (3 miles). Their duties are:—

To reconnoitre our own artillery positions and observing stations from the enemy's point of view.

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To reconnoitre the enemy's probable artillery positions, and the infantry approaches.

To watch the deployment of the enemy's artillery.

37. *Execution of the reconnaissance.*

In *encounter* the time available is short. Each patrol gallops forward to a good observing point near the road; the officer dismounts and reconnoitres with glasses while the horseholder keeps an eye on the road in order not to miss the *C.R.A.* as he advances. If an under-officer is available he may be sent off to a more distant observing point. The officer of the patrol reports personally to the *C.R.A.* when the latter comes up.

In the *advance on a prepared position* there is plenty of time for careful reconnaissance from a number of points, and a place and time will be fixed at which reports are to be rendered. In the *defence* there is no object in riding too far afield; good observing points near the position are the best. In this case the patrol should have abundant means of sending back information by orderly, flag, or telephone.

37. The method of rendering the reconnaissance report is important. In the advance, the patrol officers return to the C.R.A. and act as guides, but it is desirable that they should each leave one man out. In the defence, the patrols remain out, while one man is sent back with the report. When, at a later stage, the ground patrolled is occupied by our artillery, or fired on, it may be advisable to hand over to each commander of a regiment of artillery the officer who patrolled the ground in question, in order to assist him in his reconnaissance.

(B). DUTIES OF OFFICERS' PATROLS AFTER THE FIRST DEPLOYMENT.

39. Before the combat, the officers' patrols were kept in hand with the C.R.A. When the combat commences, they are sent back to their regiments. The C.R.A. will now find one (or at most two) patrols sufficient for his requirements. The commander of each regiment and the commander of the heavy artillery will require one patrol, but it will rarely be possible to spare patrols for the Abteilung commanders. In case of necessity orderly officers or ground scouts must be used as patrols. Batteries will usually only have under-officers available as scouts or assistant observers.

40. During the combat, the duties of the officers' patrols and scouts will be as follows:—

(a). To assist the officer controlling the fire by observation from other points, possibly including balloons. It is especially important to locate concealed positions; even a report that no enemy is present in a certain position is valuable. To observe the front fighting line; the intention of the infantry commanders and the distance separating the opposed firing lines should be observed and reported.

(b). To prepare for changes of position by reconnoitring roads, &c., leading to the front and to the rear, and all possible fresh positions

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(c). Service of protection. Usually carried out by battery staffs, the ground scouts being employed.

41. Reconnaissance of ground requires much riding at a fast pace. Reconnaissance of targets is best carried out deliberately, the officer dismounting at a good position from which reports can be quickly sent back or signalled. To learn the intentions of the infantry commanders, the best way is to find them and ask them.

Scouts sent out for protection should go no further than necessary.

(C). DUTIES OF PATROLS AND SCOUTS AFTER THE COMBAT.

Both in pursuit and retreat, the officers' patrols, who are now to be gradually collected in the hands of the C.R.A., will continue to observe the enemy and reconnoitre positions for our own artillery, till the troops are no longer in contact with the enemy.

RECONNAISSANCE AND OBSERVATION BY ARTILLERY COMMANDERS.

(A). AT THE FIRST DEPLOYMENT.

43. Reconnaissance and observation by the artillery commanders do not commence until there is a prospect of the deployment of the artillery. The reconnaissance reports of the officers' patrols should then be available; and full use should be made of them.

44. The reconnaissance must be at first directed towards assisting the General Officer Commanding Troops by enabling him to decide as to how his artillery is to be deployed. The General Officer Commanding will partly carry out this reconnaissance himself, accompanied by the C.R.A.; he will partly delegate it to the C.R.A., who will then report to him. In urgent cases this reconnaissance must be replaced by the reports of the officers' patrols, or a hasty glance must suffice. When time is available, the commanders of field artillery regiments and of the heavy battalion will assist in this reconnaissance as in paragraph 45.

45. When, on the result of this reconnaissance, the General Officer Commanding has ordered the artillery to take up positions of readiness, or to advance into action, the more detailed artillery reconnaissances are undertaken.

It is desirable that the officer commanding the artillery brigade should at once advance with the commanders of the field artillery regiments and of the heavy artillery, and with the leaders of the officers' patrols who have returned from their reconnaissance. He sends forward the commanders in the directions of the ground assigned to them, and uses the patrol leaders as scouts and to show the way either to himself or to the commanders. He then carries out the reconnaissance, meeting the subordinate commanders in their own area and conferring with them as to the result of their joint reconnaissance. It is imperatively necessary that the C.R.A. should himself inspect an artillery position either now or shortly afterwards, as also the field of view and field of fire obtainable from each, as this alone will enable him to direct the fire with certainty during the further course of the combat.

The commanders of the field artillery regiments will, in assisting in the C.R.A's reconnaissance have acquired such a knowledge of

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the targets and of the ground that when ordered to deploy by the C.R.A. they will have little to discover for themselves.

The commanders of Abteilungen, and, subsequently, the battery commanders will, when ordered to deploy, themselves undertake the reconnaissance of the targets and the ground to which they are assigned.

46. The reconnaissance may be executed as follows:—

Having reached the ground assigned to them, the field artillery adjutant or the heavy artillery observation officer establishes a provisional observation station and proceeds to observe. Horseholders and field artillery mounted telephonists remain close at hand. The commander, with one orderly and, when necessary, one horseholder (in the heavy artillery also with his adjutant), commences the reconnaissance of the position looking in the direction of the enemy only sufficiently to determine the field of view and field of fire, and, in concealed positions, also the means of indirect laying. After riding or walking once along the position the commander will have acquired sufficient information to order his troops to advance and deploy. He will send this order by orderly officer or by orderly. The reconnaissance is then completed, including, in concealed positions, that of the observing stations. It is desirable that commanders of Abteilungen or battalion and battery commanders should mark the position of their batteries. Finally the commander returns to his observing station and informs himself as to the results of the observation carried out up to date, and as to the ranges and lateral angles measured on the map.

In carrying out all these duties it is especially important not to attract the attention of the enemy. Therefore the subordinate commanders, including commanders of Abteilungen or battalions and battery commanders, may be obliged to dismount and even leave their staffs behind.

(B). AFTER THE FIRST DEPLOYMENT.

47. The commander will remain in observation at his post while the batteries remain in position of anticipation, and during the fire combat. In special cases he may be justified in riding away from his post for a short time, as for instance to obtain a better view of the combat or of a concealed target. He has at his disposal the orderly officers for short-distance scouting and the officers' patrols for more distant reconnaissance.

48. The observation station is established under the direction of the adjutant, or in the heavy artillery, of the observation officer. The tripod telescope, carried by a mounted man, is immediately available; the subordinate commanders can supply further material from their observation wagons, which should be met on arrival by one of the staff and conducted to the observation station. After the batteries have arrived, working parties may be ordered up to construct more extensive cover and entrenchments.

49. The service at the observation station should be so arranged that observation is carried out systematically with due division of labour, arrangements being made for the relief of the observers when required. For the higher commanders the most important matter

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is to observe the tactical situation and to see that the tactically correct targets are engaged. Observation of effect is here of secondary importance. For the subordinate commanders the principal matter is to check the location of the targets and to observe the effect. The tactical situation is here of secondary importance.

50. When a change of position is to be carried out the C.R.A. rides forward to reconnoitre the new position as soon as he has given the order to change position. The other commanders follow him as soon as they are satisfied that the move from the old position can be duly carried out; but in retirement they remain with their commands until these are no longer under fire. The reconnaissance of the new positions is carried out as in the first deployment.

THE METHOD OF DEALING WITH RECONNAISSANCE REPORTS RECEIVED BY THE STAFF.

51. The work to be done in connection with the reports, &c., received from different sources includes their comparison, combination, and forwarding them to the proper persons. This is the special duty of the Adjutant, and in the heavy artillery also of the observation officer. It is highly desirable that information received should be noted on the maps of both of the staff and those of the mounted orderlies. With the staffs of Abteilungen and battalions it is very convenient to make simple panorama sketches which can be multiplied by means available in the field. By marking certain points on these sketches with numbers or letters, subsequent orders as to fire direction may be made simpler and easier to understand.

THE ISSUE OF ARTILLERY ORDERS, AND TRANSMISSION OF REPORTS.

Orders:—

52. These are of two natures, namely, orders that are always given in the same form, such as those for deployment, change of position, &c., and special orders, such as those for a reconnaissance.

53. In action, most orders are given verbally, either personally or by messenger or telephone. Written orders are only resorted to when they have to be sent to a distance or when no officer is available.

54. All orders that are constantly repeated should, in each brigade, always be given in the same sequence and form.

55. With verbal orders, the routine form laid down for written orders is neither necessary nor desirable. The main point, on emergency, is to convey the matter which is most important to the person who requires to know it; less important or urgent matters can wait. For instance, it would be wrong to delay the issue of urgent orders for a deployment till all the commanders were present, and it would be equally wrong to delay a tactical order for the insertion of field hospital and ammunition column orders.

56. In verbal orders, briefness is not always an advantage; thus orders for a night attack may have to include many details. But verbal orders sent by orderly must be brief and to the point. When giving orders regarding places, &c., it is as well to mark them in on the recipient's map, or, if sent by orderly, to send a marked map with the order.

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Reports:—

57. These also may be classed as ordinary and special. The usual tactical reports belong to the first class, those embodying a special decision to the second.

58. Reports are rendered verbally or over the telephone by batteries; those rendered by Abteilungen and larger units are often in writing. It is advisable to use marked maps as recommended in paragraph 56.

59. For ordinary reports it is advisable to use a printed form with spaces for the following:—

1. Own position, including observing station (best indicated by a sketch).
2. Target and target reconnaissance, with sketch.
3. Effect as judged or observed.
4. Own losses.
5. Ammunition available.

(To be continued).

Germany.

Some notes on the new (1910) provisional amendments to the 1907 "Field Artillery Regulations."

Translated from "The Revue Militaire des Armées Etrangères," July, 1910, By Major B. Atkinson, R.F.A.

(Communicated by the War Office).

NOTE.—Numbers of paragraphs refer to the German Field Artillery Regulations," 1907; and to the "Practice Instructions," 1907.

General use of indirect fire:—

"Field Artillery Training," of 23rd March, 1907, has already been subjected to certain amendments, which have been briefly analysed on p. 447, Vol. 2, 1909 of this magazine. Fresh modifications have now been isused. They are at present merely provisional, and will not be definitely sanctioned until justified by experience in the field.

The most important point to note in these modifications is the disappearance of the "semi-covered" (*fast verdeckte*) position.[1] Artillery will in future occupy only positions in the open (*offene*) and positions under cover (*verdeckte*). Treating of positions under cover, the provisional amendments distinguish between "crest cover" positions (*Randstellung*) and positions well in rear of the cover. In either case, personnel and materiel are to be completely hidden from the enemy.

[1] In this position the guns are "covered from view, but are so near the crest that they can be layed for line by a layer standing at the gun or upon it."

In "Covered positions," the "guns are behind cover such that the guns cannot be layed for line from the position."

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It might appear, at first sight, that the difference between the new "crest cover" (*Randstellung*) and the former "semi-covered" position (*fast verdeckte stellung*) is merely one of degree. This would, however, be to take a very superficial view of the case. For the main characteristic of the "semi-concealed" (*fast verdeckte*) position—and that which distinguished it from the position under cover—was not the mere fact of its distance from the crest, but that each *individual gun* obtained its initial direction by laying on the target or on an aiming point near it.[1] For a change of target (Sec. 148) the sight and corrector were brought to zero, and the gun was brought on to the new objective by the procedure just described.

In short, the "semi-covered" battery employed indirect fire, but the guns obtained their direction independently.

In the new "crest cover" position (*Randstellung*), the initial direction will, on the contrary, be obtained by methods employed in covered positions; that is, parallel lines will be obtained from a "base" gun (*Grundgeschütz*), which will be the normal procedure; or all sights will be laid on a *common* auxiliary aiming point. In short, the German artillery, when under cover, and whatever the amount of that cover, will henceforth invariably employ collective laying.

The analysis of the amendments referred to above (p. 447, vol. 2, 1909) also brings to light that the German manual has begun to provide for the results of this method of laying, in that it prescribes, that, during indirect fire, changes of target will be effected merely by giving out a switch angle, and that distribution of fire will be effected by indicating the amount of dispersion[2] (Sec. 143a).

It would even appear that the new edition aims at the more frequent use of collective laying in positions in the open. For, while the present Regulations merely *permit* a battery commander to order a common aiming point for his battery (Sec. 144, para. 6), should a good one be available, the new provisional amendments lay down that the use of such an aiming point *is of advantage* when firing direct, should the target be indistinct or difficult to point out.

Still following the same train of thought, the provisions for the position in observation (*Lauerstellung*)[3] have been modified and more closely defined; while, according to the (1907) manual now in force, a battery in observation should not occupy its position until just before opening fire (Sec. 336), it will in future be brought into action in its position, and its guns will be layed on the target, or on a reference point, and be ready to open fire.

Not only do the provisional modifications to the 1907 "Field Artillery Regulations," improve the methods of indirect fire, but they

[1] "The Field Artillery Regulations," (Sec. 144) laid this down "as a general rule"; but the reservation would appear to have been forgotten in actual practice. ("Artilleristische Monatshefte," June, 1910, p. 459).

[2] This paragraph is somewhat obscure, but the chief point appears to be that in both kinds of covered position changes of target will be effected by giving an angle to all the guns, not by laying guns individually.

[3] According to the 1907 Regulations, guns in a position of observation are unlimbered, but have to be manned up to their position when fire is to be opened.

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tend towards its more general employment, for while, on the one hand, they for the first time bring out clearly the advantages of positions well behind the crest, which "force the enemy to distribute his fire, and, while abandoning economy of ammunition, put up with less effect" ("Deutscher Offizierblatt, 21st May, 1910); on the other hand they dwell on the disadvantages and even on the danger of positions in the open. As an artillery officer sums up in "Militarische-politische Korrespondenz," of 14th May, 1910, "From the above it may be concluded that the new Regulations regard positions in the open as having little in their favour and as seldom desirable; the future tendency will thus be towards counter batteries (*contre-batteries*)[1] and infantry batteries, in short to a specialization in battery positions which the German artillery has hitherto always avoided... the tendency is therefore to adopt the French views on this subject, as also on methods of fire."[2]

Methods of fire:—

This point requires a brief explanation. The "Practice Instructions," of 15th May, 1907, were brought up to date last year by amendments issued by the War Ministry ("Militar Zeitung No. 20, of 15th May, 1909), to which no further amendments have so far appeared on the following three points; improvement of percussion fire (Secs. 101-111): percussion fire for effect; howitzer fire against shielded batteries.

The obvious intention of these official instructions is to *improve and accelerate* fire in these cases, while leaving ample latitude to the battery commander.

Adjustment of elevation during percussion fire[3]*:—*

The correct elevation was obtained up to the present by firing six rounds,[4] commencing from a flank (*Flügelfeuer*), until from one-third to two-thirds fell in the target; fire will, in future, be by *rafale* ,usually of three rounds, or by single gun fire (this latter method was the subject of an amendment to Sec. 133 of the manual) (cf. p. 447, vol. 2, 1909, "Revue Militaire." Should the three rounds fall alike, the elevation will be altered by 50 or 25 millimetres; should they form a bracket, the elevation will be retained. Should the latter result occur twice running, the elevation will be definitely adopted.

Percussion fire for effect:—

In the case of fire against shielded batteries or a close attack, "rafales" (*Gruppenfeuer*) may be employed as soon as a bracket has been obtained; or, if the range be under 600 metres (660 yards) the bracket may be omitted.

---

[1] It does not appear whether the new amendments definitely state that *contre batteries* are to be used. This is a point of great interest, as the Germans have hitherto been very unwilling to copy the French procedure.

[2] A German artillery officer in Militarische-politische Korrespondenz, 14/5/10.

[3] Analysis of firing manual on p. 453, vol. 2, 1907, "Revue Militaire."

[4] The six rounds referred to were fired as a verifying series.

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Howitzer fire against shielded batteries:—

The field artillery school of gunnery experience, has proved that, by reason of the effect of the burst towards the rear, the shell of field howitzers with time fuzes[1] will produce good results against the protected personnel of shielded batteries.

Attempts have therefore been made to simplify and accelerate this method of fire; the more so that, since the adoption of a single projectile for the light field howitzer (cf. p. 503, vol. 2, 1909, "Revue Militaire"), it seemed advisable to extend its use.

The new method of firing common shell with time fuzes will be very similar to that of fire with time shrapnel. Minor alterations of elevation will be discarded, and it will be sufficient to obtain a 100 metre bracket. Fire for effect will be opened at the extremes of the bracket and half-way between them. Small alterations of elevation will be avoided, as they do not seem to give good results except after a long period of fire.

Summary:—

To sum up, the recent provisional and accepted amendments to German field artillery procedure mark a distinct step towards the general employment of indirect fire. On the other hand, the methods of fire have been altered only in minor details, of which the most notable is that relating to field howitzer time shell fire.

Any improvements in materiel necessary for the preparation and delivery of such fire, have been based on the innovations described above. The sighting arrangements have not been altered; but every battery commander of 96 n/A field guns, instead of having only a graticuled prismatic telescope (Scherenfernrohr), will now be in possession of a director[2] (Richtkreis), and one of the observation wagons described below.

Field Artillery observation wagon:—

The field artillery observation wagons, which have recently been adopted in Germany to the amount of one per battery and brigade staff, are already in use in many of the units. According to the "Militarische-politische Korrespondenz," all artillery regiments will be provided with the new vehicle between now and the manœuvre season.

The observation wagon consists of limber and body, built very much as those of the ammunition wagon. In peace they have teams of four hourses; but as, on service, the limber will be full of ammunition, the teams will be increased to six. They will not be used for parade movements. The shielded wagon body will shelter

[1] The field howitzers have hitherto had a high explosive shell and a shrapnel. In future they will have a "combined shell" which can be used either with time or percussion fuze.

[2] According to the practice instructions of 15/5/07 (Sec. 272), only light field howitzer batteries were to have directors at the rate of two per battery. The director (Richtkreis) must not be confused with the dial sight on the gun (Richtflache); it consists of a graduated disc with a compass and sight, all mounted on a tripod. By its means the gun can be laid parallel on an objective which cannot be seen from the position.

It was noticed that field batteries had received their directors at the Corps Manœuvres, 1910.

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the battery or brigade commander at his observation station. It wil also contain, while on the march, all the instruments necessary fo the conduct and observation of fire. But, before the fight begins, the battery telescope, the directors and the telephone materiel will be removed from the vehicle and carried on the saddles of the battery or brigade staff. The observation wagons themselves will follow their batteries and come into action simultaneously with them. They will not precede the batteries unless the latter are retained in positions of readiness. As a matter of fact, this restriction is unnecessary in all other cases; for the batteries can be brought into action at least as quickly as the observation wagons.

Heavy artillery, on the other hand, will, as a rule, have its observation wagons to the front, for the simple reason that the latter, being lighter, can trot for longer distances, and can thus reach their positions sooner than heavy mortar or howitzer batteries, which must, as a rule, come into action at a walk.

The field artillery observation wagon also carries the battery or brigade commander's observation ladder, which enables him to choose his observation station without undue regard to the lie of the ground; the use of this ladder will often enable him to be close to his battery occupying a position under cover, and to command it by voice. The movable shields on the ladders will protect him from hostile fire.

The battery telescope is fixed to the ladder behind the shield, as is also a seat for the observing officer. The introduction of observation wagons, and also of telephones and directors, has made fresh demands on the horsing of field artillery, which, for a considerable time, has been inadequate. For this reason a small increase in the establishment of horses is being provided; but, until it is actually accomplished, it will be necessary to use cast horses and even, in urgent cases, the gun teams. For the observation wagons must be used during all training, even if the result be the horsing of fewer guns.[1]

[1] At the German manœuvres, 1910, it was noticed that some batteries had been reduced to four guns in order to provide horses for the observation wagons.

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The employment of Field Artillery in France and Germany.

Translated from "Journal des Sciences Militaires," 15th March, 1910.

Both French and German regulations lay down that the principle mission of field artillery is to assist the other arms.

It cannot be too strongly insisted upon that artillery is an auxiliary of the infantry; the arm which alone can ensure victory.

It is surely a mistake to assert that Q.F. artillery has brought about a revolution in infantry tactics. This is confounding march dispositions under fire, with fighting dispositions; which in reality consist of nothing more than a line of riflemen more or less spaced out. This is caused by the rifle and not by the gun. In order then, to precise the doctrine of the employment of artillery, its principal mission being thoroughly determined, it is only logical to first determine what assistance the infantry should receive during the fight. It then becomes necessary in order to decide upon the nature of this aid and moment when it becomes useful, to precede this by an analysis of the obstacles the infantry will encounter both in the offensive and defensive.

In the former case infantry will encounter:—

1. Artillery fire from the time of entering upon the shrapnel zone.
2. Combined artillery and rifle fire from about 1000 to 1200 yards, and right up to the time when the distance separating the adversaries' lines prevents artillery from acting.
3. Rifle fire from 400 to 500 yards right up to the assault.

Let us now see how artillery can assist this firing line in the different phases of the action.

1st phase of artillery fire.—During this period the artillery's best means of supporting the infantry is to try and silence the enemy's guns or to divert the fire of these guns on to itself. Not that the infantry cannot move forward, even under a hot fire; but its advance is then necessarily very slow, owing to the open formation that must be adopted to minimise losses. This leads to the application of new tactics; that of moving under artillery fire; when it is incumbent upon the infantry not to present targets inviting the hostile artillery to enter into action.

To fulfil its mission what should the opposing artillery do? There are two possible cases:—

(a). The artillery of the defence does not attempt to stop the hostile infantry's advance. The artillery of the attack has then no reason to interfere.

(b). The artillery of the defence tries to interrupt the advance of the infantry.

The attacking batteries ought in this case to try to subdue its fire; to do which it must vigourously engage in action with all the means at its disposal. This constitutes the artillery duel.

If the artillery of the defence, neglecting that of the attack, makes the infantry its sole objective, it runs the risk of being at all events neutralized if not destroyed.

If the batteries of the defence try to find safety in cover, they may shelter themselves from the enemy's fire but they are of little use against the infantry. If they wait until the two infantries are at grips, they are playing into the enemy's hands in allowing him to cross a zone 2,200 to 3,300 yards in depth without loss.

To refuse the artillery duel, then, implies the idea of inferiority for one side and the desire of remaining on the defensive, which is generally the result of a previous situation, or of a plan decided upon in advance.

When forces attack each other whilst on the move, or one side endeavours to seize the initiative, and when as a result one of the two infantries tries to move forward supported by its guns, the force of circumstances will bring about the artillery duel; for the adversaries will endeavour to destroy the principal obstacle to their progress from the time battle is joined.

The stake is an important one, to wit the two opposing artilleries obtaining liberty of action in the succeeding phases of the fight, i.e. being able to move to within effective range so as to support their infantry.

The superiority of artillery fire in the phase we are treating of, allows the assumption of the offensive; and thus increases the chances of victory. This is the German theory.

The French regulations lay down that there will be no artillery duel but it will be replaced by a series of successive encounters, since it is maintained, it no longer has a *raison d'être*, being barren of result, the personnel forming the target being sheltered behind their shields. But is it not indeed a result that the attacking infantry do not then come under fire? Really the French regulations do not consider this phase of the action, on which often depends the ultimate attitude of adversaries in an engagement when both sides are in motion.

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Admitted that artillery does not destroy, and that destructive fire does not yield results, it can, and this is the essential, neutralize the opposing artillery; i.e. prevent its acting at an opportune moment.

The main mission is now, as always, to keep artillery fire from ones own infantry. This result was obtained by the old artillery by destroying matériel and personnel; by modern artillery by preventing this personnel from acting, by neutralising it. Whether artillery is placed in front of the infantry, as in the days of the smooth bore, or in rear as it is now, the object to be attained is ever the same viz.: to protect the infantry from coming under (the enemy's) artillery fire.

The neutralising of the artillery has the same consequences as that of the infantry. There is no visible difference, in fact, between batteries buried behind the crest and reduced to indirect fire, and skirmishers crouching behind trenches and firing into the air.

It is in this zone that artillery should really open up the way for the infantry. Using the powerful means at its disposal according to the nature of the obstacles to be destroyed. Always bearing in mind that above all it is the combatant that must be hit.

Even when the range is found, artillery cannot hope to destroy trenches, or the cover which the ground affords; but it can compel the defenders to "go to earth"; it neutralizes him, and thus the attacking infantry can continue its forward movement.

The German regulation says "Artillery, while fully engaging the enemy's guns, should turn as much of its fire as possible on to the infantry; in order to facilitate the forward movement of its own infantry." Artillery is divided into batteries for infantry, and counter-batteries; the duty of the latter being to reply to the hostile batteries, which are most dangerous to the infantry.

The French regulation only lays down principles for the employment of field artillery during the phase of action, when the two infantries are engaged. The artillery duel finds no place, except in the infantry attacks, and then the infantry will really only serve as a bait to induce the enemy to disclose his positions. This is an honour which will cost him dear.

The artillery duel, then, is still an actuality. A vigorous offensive on the part of the infantry is only possible when superiority of artillery fire is obtained. To desire to avoid this duel is to confess impotence.

In the second phase, the obstacles to be encountered by the infantry are the following:—

(a). The enemy's firing line supported by their batteries.

(b). Material obstacles.

In order that artillery may produce its maximum effect the work to be done must be divided up as thus:—

1. The batteries with the infantry against the enemy's firing line, which must be, if not destroyed, at least demoralised.

2. The counter batteries, to prevent the enemy's artillery coming into action against the firing line or the infantry batteries.

In order to support the infantry's advance, at any moment, it is necessary that artillery should be in permanent communication with it. In the German army artillery officers act as scouts for targets. A simple system of signalling between the infantry and its artillery is necessary; so that the former may indicate to the guns in support the moment of the assault.

The firing line is alone in a position to seize upon the instant when the assault can be attempted with success.

This brings us to the moment when the infantry batteries can no longer take as their objective the hostile firing line, by reason of the short distance between the combatants. By following up "time" shrapnel with "percussion," the batteries can still continue their support up to 250—300 yards, provided that observation is easy.

Infantry fire phase:—

During this phase the infantry is left to its own resources. If the firing line has been unable to obtain superiority of fire with the support of its own batteries, it must sufficiently weaken the enemy by repeated attacks, cost what they may, in order that the assault may be made. It is the moment for its great sacrifice.

The infantry batteries must meantime not be disinterested. They increase their range, and try to cut off the firing line from its supports and reinforcements.

During this period the infantry batteries should carefully watch the flanks of the assaulting line and provide it with a safe zone of sufficient area to prevent surprise by fire.

The counter batteries continue to watch the hostile artillery and prevent its taking part in the defence at close range, of the points attacked.

In the defence, infantry has one sole object; to destroy the assaulting line of battle, or at least to cause it such losses as to check its forward movement. Its superiority lies in being behind cover against an enemy who must necessarily come into the open. The mission of the artillery generally is to co-operate in the destruction of the opposing line of fire, either by acting directly against this line, or by ensuring liberty of action for its own infantry, that is to say, by neutralizing the hostile artillery which has it under fire.

The choice of defensive positions is of very great importance: in this choice the G.O.C. must ensure that each arm is placed to its greatest advantage. The disposition of the artillery and infantry with regard to each other on the ground should, in addition, allow of their constant inter-communication and co-operation during the fight. This disposition is naturally based upon the respective

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limits of their effective ranges. The rifle becomes dangerous against infantry at 1200 to 1000 yards while gun fire is effective up to ranges of 4500 yards; and even 5,500 yards against artillery, 3,300 yards against infantry. These ranges mark in principle, the limits of the field of fire for each arm. So that on level ground the infantry's firing line must not be less than 500 yards or more than 2,200 yards from the artillery, if it is to be effectively supported, and at the same time, allow the latter to fire over their heads.

Being subordinated to the attack, it is possible to analyse it in the same phases namely:—Phase of artillery fire; phase of the combined rifle and artillery fire, and phase of rifle fire.

Phase of artillery fire:—

This is comprised in the zone out of reach of infantry fire. The artillery of the defence has two objectives; the infantry in movement and the artillery supporting this movement.

On account of the range the infantry is but slightly vulnerable, if the formations it adopts are suitable.

The batteries with the infantry (the infantry batteries) will at first be detailed to retard the infantry. But the chief mission of the artillery will be to fight the adversaries artillery, without compromising itself. In this phase it will have recourse to more or less covered positions. It is in a better position than in the attack, since it knows the ground and has been able to make preparations for opening fire, and to construct emplacements.

The phase of combined gun and rifle fire:—

The infantry of the defence is now in the presence of two adversaries, infantry and artillery.

It acts by fire against the first, against the latter it is impotent. The artillery of the defence will have the same objectives as in the first phase; but this time directing its principal effort against the enemy's firing line.

As to the counter batteries they will above all try, even after an unsuccessful duel, to prevent the hostile batteries changing position so as to come within decisive range.

The phase of rifle fire:—

The two infantries are left to themselves by reason of the short distance apart. The artillery (infantry batteries) of the defence should as in the attack, prevent the hostile firing line from being reinforced or replenished with ammunition.

The counter batteries will continue to act against the hostile artillery, preventing it from acting, in particular, against counter attacks, when launched. In this phase, the final crisis, the effect of artillery comes, more than in the preceding phases, before its safety.

The choice of artillery positions:—

The German regulations lay down three[1] positions for batteries; in the open, semi-covered, covered. Concerning the infantry fight, the following is laid down. To ensure the decision in the infantry fight, field artillery should give up the advantages of the covered position, and almost always fire, either from behind partial cover, or in the open. In the offensive artillery must utilise the advantages of a covered position, or one in the open according to the exigencies of the situation. As the infantry attack progresses the artillery should make less and less use of cover. In a word. Effect before protection. The French idea is that these principles are in conformity with the reality of facts, and their application ensures material support, and moral effect.

Experience proves that completely covered positions have such inherent drawbacks that in principle they must be rejected during the course of the fight.

Above all completely covered positions are not suitable in the defence for infantry batteries, whose targets are very mobile groups of skirmishers moving by short and rapid rushes.

An attempt has been made in the foregoing to show that the German regulations place more importance than the French upon the exigencies of the fight as regards the employment of artillery, and artillery fire. Also it is evident that the adoption by the German army of the light field howitzer, supplies a want which must not be overlooked.

It is evident that to bear fruit the combination of the two arms, artillery and infantry, in the field must be based upon common teaching, in conformity with the results of experience in the most recent campaigns.

Artillerymen will pardon an infantryman for thus venturing to intrude upon a subject sacred to them, but they will themselves admit that it is equally a matter of interest to infantry as to themselves.

C. O. C. Hunt, Lieut., R.F.A.

[1] The semi-covered position has now been given up.—*A.J.H.*

"Neue Militärishe Blatter."

Précis of Contents of Nos. 7, 8 and 9.

No. 7.

1. "A comparison of the military forces on the Austria-Italian frontier."

A discussion on the strength of the frontier troops of Italy and Austria-Hungary in 1900 and 1910, showing that although both powers have the same number of battalions yet Italy has on the frontier over twice the number of

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field batteries and nearly three times the number of squadrons as Austria-Hungary.

2. "The question of a military Alliance between Holland and Belgium."

Such an alliance would benefit Belgium.

3. "Military service in Morocco."

System of recruiting. Splendid material. The best in the world for bearing hardships and undergoing privations. Even better than the Turk. Conditions of artillery, bad. Want of good generalship; but masters in guerilla warfare.

4. "A Glider."

Lieutenant Corwin, of the Austrian army went in a glider (boat), invented by himself, from Vienna to Pest (280 kilometres) in 4 hours and 25 minutes, thus at a rate of over 62 kilometres an hour. The Corwin boat has an engine of only 12 h-p. When going at full speed, the boat literally hovers over the water, the screw and a small surface of the boat only touching the water.

5. A criticism of an article "The Imperial Army Overseas," which appeared in the "Army and Navy Gazette."

Figures are given of the colonial troops available, but it is pointed out that the composition, discipline, command, organisation and equipment of these troops would render them more a hindrance than a help to any regular troops.

6. "The history of a Flag."

No. 8.

1. "Open and concealed positions"; by Balck. Colonel. (To be continued).

2. "In what way can the cinematograph and scioptics be put to use in the army"?

The following uses are suggested:—

(a). Lectures with the help of the cinematograph.

Explanations of formations on the march, camps, etc., by means of films.

(b). Practical use of the cinematograph and scioptics in the army.

(c). Subjects for instruction of N.C.O's and men.

Subjects for magic lanterns:—

(1). Germany's reigning princes. (2). Organisation of the army. (3). The rifle and its parts. (4). Positions for shooting. (5). The knapsack. (6). Fire trenches.

Subjects for the cinematograph:—

(1) Salutes. (2). Mounting and dismounting guard. (3). Sentry duty. (4). Unloading. (5). At the butts. (6). Packing of the knapsack. (7). Company in the attack. (8). Manœuvres.

(d). Instruction of officers in the organisation, etc., of foreign armies. Films showing parades, manœuvres, action of artillery, cavalry, etc., of various nations would be most instructional and would give officers a general idea how their methods differed from those of foreign nations.

3. "Airships."

An account of German and French flights.

4. "Regimental bands, and are they unnecessary."

5. "History of the Italian army."

6. "Serious defects in the organisation of the German army, 1910."

Shortage of horses in the field artillery. Portable kitchens not issued yet. Entrenching tools for infantry and cavalry not issued yet to all. The issue of machine guns to the infantry not completed. Several divisions with incomplete number of field batteries.

7. "French and German reserves. A comparison, 1908."

8. "Comini's hand grenade. Italy."

This hand grenade weighs 600 g. with a charge of 70 g. fine powder and can be thrown up to 60 metres. It is fitted with a percussion fuze, ensuring safety during transport. The fuze is graduated up to 12—14 seconds and has a patent safety arrangement and not a pin. Explosion covers radius of about 40 metres, and grenade bursts into about 28 pieces.

No. 9.

1. "The impending re-organisation of the Russian army." (To be continued).

For various reasons but chiefly on account of the importance of the Eastern frontier, the strength of the Army Corps and their distribution is going to be re-organised.

2. "Open and concealed positions." (Conclusion).

3. "The German cavalry carbine, '88 and '98." A comparison.

4. "Italian colonial troubles."

5. "Revision of the pension scale in Russia."

6. "The question of the supply of ammunition for the rifle."

Giving the amounts allowed annually for infantry, rifle regiments, and cavalry for practice.

A. E. A. Dobson, Lieut. R.G.A.

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The Technique of Artillery Command

(Führungstechnik der Artillerie).

Field and Heavy Artillery in Field Warfare.

By Major General Hoehn, Comdg. 1st Brigade, Bavarian Field Arty.

TRANSLATED FOR THE GENERAL STAFF BY COLONEL H. A. BETHELL, R.F.A.
Published by kind permission of the author Major General M. Hoehn.

(Continued from page 143).

THE ADVANCE INTO ACTION.

DUTIES OF THE GENERAL OFFICER COMMANDING TROOPS.

60. Before the march the G.O.C. issues orders for the assembly and the order of march, based on the following principles:—

(1). The *advanced guard* of a division usually receives one Abteilung of field artillery—as advanced guard artillery, which marches behind one of the units of the main body of the advanced guard. This is sometimes accompanied by a light ammunition column or part of one, but never by heavy artillery,

(2). The mass of the *field artillery* marches with the main body in rear of the leading battalion.

(3). The *heavy artillery*, when the division marches in fighting formation, follows the field artillery, except that its observation wagons may be ordered to precede the latter.

(4). *Light ammunition columns* follow at the rear of the fighting troops. "Artillery" ammunition columns usually march with the leading echelon of the ammunition column and train, in rear of the fighting troops and in front of the heavy baggage.

(5). In a cavalry division the *Horse Artillery* usually follows the leading brigade, the light ammunition column is with the heavy baggage.

(6). *The assembly for the march* takes place on the main road or on roads leading into it. The time and place are ordered for each regiment or independent Abteilung.

61. During the march the G.O.C. is usually on the move between the point and the leading unit of the advanced guard. In smaller forces and in the cavalry division he is between the leading uuit and the main body of the advanced guard.

The *commander of the advanced guard* usually marches immediately in front of the G.O.C.

Thus the O.C. advanced guard and the G.O.C., are always in front of the artillery, and when the enemy is encountered, the former can so dispose his artillery as not to interfere with the subsequent action of the artillery as a whole.

If a special commander for the main body is appointed, the artillery are under his orders for march discipline only; but he should be warned in good time when the artillery are required to deploy.

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ARTILLERY COMMANDER AND ARTILLERY UNITS.

62. The *Brigade Commander* with his staff and the officers' patrols ride with the G.O.C. The Brigade Commander personally rides with the officers of his staff behind the officers of the G.O.C's staff; his subordinate staff and officers' patrols ride behind the subordinate staff of the G.O.C.

The *Commander of the Advanced Guard Artillery* with his staff and one officers' patrol rides in similar order with the officer commanding the advanced guard.

The *Commanders of Field Artillery Regiments* and of the *heavy artillery* with their staffs may conveniently be called up to the brigade commander beforehand, and then ride in rear of the divisional staff The battalion observation officer also joins the staff of the commander of the heavy artillery.

63. In order to keep up communication between the brigade commander and the head of the artillery column, it is advisable for the leading Abteilung to send forward connecting files (Nos. 1) who ride beside the infantry column at about quarter mile distance, and also in the intervals of the column, and pass back simple signals. "Trot" and "Halt" are usually sufficient.

If part of the artillery has been allotted to the advanced guard, this must also be in communication with its commander. But as it is undesirable to have two chains of connecting files side by side, the artillery of the main body should at first push forward its chain only as far as the artillery of the advanced guard, and when this advances into action, should push forward the chain as far as the Brigade Commander.

An officer should if possible be at the head of each chain of connecting files. This officer rides with the staff of the C.R.A. or O.C. artillery of the advanced guard, hears the orders given and sees to their transmission.

64. All other artillery commanders ride with their units in the following order:—

Abteilung Commanders receive orders whether to ride at the head of the regiment or of the Abteilung. They are usually accompanied by their mounted telephonists.

F.A. Battery Commanders with their immediate staffs should preferably march at the head of their Abteilung. They are followed by their mounted telephonists.

Heavy Artillery Battery Commanders with their immediate Staffs ride in front of the massed observation wagons of the battalion, tnat is, either at the head of the battalion or at the head of the field artillery of the main body.

65. The artillery units, including the observation wagons, march in the formation ordered by the G.O.C. in accordance with "F.S. Regulations. The formation of assembly is also as laid down in "F.S. Regulations." Special attention is to be paid to shortening the length of the columns; this applies also to halts during the march.

66. The *immediate command* of the units devolves upon the senior of the Abteilung commanders remaining behind, or on the senior battery commanders. The massed observation wagons of

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the heavy artillery are at first under the command of the senior battery observation officer. (The battalion observation officer is with the battalion commander; see paragraph (62)). It is the duty of each of these commanders to bring his units punctually to the point of assembly and to join the column of march in the prescribed order. The commander of the leading Abteilung establishes communication with the C.R.A. or with the O.C. artillery of the advanced guard by a chain of connecting files headed by an officer.

The commanders of the Abteilungen in rear each establish communication with the next in front by sending an officer and mounted orderly to the head of it.

During the march all commanders provide for safety reconnaissance to the flank. It is convenient to consider the Abteilung or battalion as a march unit and to give each commander of such a unit one mounted orderly from each battery to carry orders, to find the way, and to act as scouts for protection.

67. When the C.R.A. wishes the artillery to advance, either to be in readiness for action or for deployment, he will order them to trot up.

In order to deploy, the commanders of field artillery regiments and of the heavy artillery send back orderly officers to show the way.

It is especially important that artillery and infantry should interfere with each other as little as possible. When deploying large bodies of troops it is impossible to prevent the artillery and infantry from crossing. An officer must be sent forward to warn the infantry when the artillery have to cross, and the artillery must have intervals between the batteries to enable the infantry to hasten through on a broad front.

The commanders remaining with the units may be called forward either from the column of march or from the position of readiness.[1] The most important matter is to bring the Abteilung commanders on; it will, therefore, be well to make it a standing order that all Abteilung commanders are to hasten forward as soon as the signal to trot is received; they then meet their regimental orderly officers on the way, who give them further instructions. The battery commanders of heavy artillery, with their observation wagons, must also ride forward at an early stage, but they will do well to await the arrival of their orderly officers with the battalion in order not to miss them. Field artillery battery commanders are not usually called out till the position of readiness is reached. But with the artillery of the advanced guard it is desirable that they should ride forward at once.

The numerous staffs must ride forward with the strictest march discipline, in closed column, and with due regard for the infantry.

68. The light ammunition columns of field and heavy artillery and any artillery ammunition columns allotted to the force, march in the order laid down by the G.O.C. It is desirable that each light column of field or heavy artillery, and the artillery ammunition column, should send a mounted orderly to the G.O.C. before the beginning of the march.

[1] The author appears to contemplate the assembly of the artillery as a whole or in large bodies in a position or positions of readiness, whence they advance to take up their positions for action.—*Translator.*

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69. *Approximate distances on the march:—*

Field artillery Abteilung	880 yds.
Horse artillery Abteilung	770 yds.
Howitzer battalion of 4 batteries	1,200 yds.
Howitzer battalion of 3 batteries	880 yds.
Light F.A. ammunition column	440 yds.
Light heavy artillery ammunition column	550 yds.
Artillery ammunition column	660 yds.
Heavy ammunition column	330 yds.

THE FIRST DEPLOYMENT.

Duties of the G.O.C.:—

70. When plenty of time is available, as in the defence or in the attack on a position, the first deployment is carried out in two stages. The G.O.C. first orders the artillery to take up positions of readiness, and afterwards he orders the advance into action. When less time is available it will be advisable to use positions of readiness, but the conditions will often compel the artillery to advance into action before this first stage is completed. In very urgent cases and in cases of surprise it is necessary for the artillery to advance at once into action without taking up positions of readiness.

71. A position of readiness may be taken up in two different ways, either limbered up or unlimbered. The former implies that the batteries are ready at hand in more or less deployed formation, and is simply called the " position of readiness " (*Bereit stellung*). This is used when the positions for action are not yet accurately determined. When the guns are unlimbered, this is called the " position of anticipation " or " lie-in-wait-position " (Lauerstellung); this is used when it is known that the artillery will open fire from a certain position concealed from the enemy's view.

The order to take up the positions of readiness is the first important order given by the G.O.C. during the combat, and should be issued as early as possible. It must contain the following:—

(1). Whether the whole or a part of the artillery are to be held in readiness. Usually the order will apply to the whole of the artillery; it is only when the enemy is known to be in inferior force, or in cases of doubt, when fire is liable to be opened upon the force by surprise, that only a part of the artillery may be ordered to be held in readiness.

(2). Whether the artillery in readiness are to be limbered up or unlimbered. This depends upon the greater or less probability of the artillery having to advance, and upon the country. This matter is best left wholly or partly to the C.R.A.

(3). Place where the artillery are to be held in readiness.

(4). Preparatory measures to be taken. From the position of anticipation certain areas will have to be kept under observation; from the position of readiness (limbered up) preparations must be made to take up the prospective positions for action and to open fire on certain areas without delay.

72. The advance into action is completed by the order to open fire. But between this order and the actual opening of fire a con-

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siderable time may elapse, if the artillery is still in position of readiness or even in column of march. The time when the mass of artillery is called into action depends upon purely tactical considerations. When the enemy is already in position it is desirable to open fire early in order to clear up the situation. In the defence the enemy should open fire as soon as the attacking artillery exposes itself. In battles of encounter, including cavalry action, the mass of the artillery should not usually open fire until the infantry or cavalry advance. But advantage must be taken of opportunities to inflict loss upon the enemy, especially upon his artillery, at an earlier stage.

In framing the order to advance into action and open fire the following points should be considered:—

(1). Whether the whole or part of the artillery are to come into action. Usually the object is to produce decisive effect, and as it is never possible to determine beforehand how much artillery will be required to produce this result, it is usual to place the whole of the artillery at the disposal of the C.R.A. It is only in engagements obviously of a partial nature, such as a reconnaissance in force, or when an opponent who exposes himself incautiously is to be overwhelmed with fire, that the number of batteries brought into action should at first be limited. Setting apart a portion of the artillery as a *reserve* is not justifiable except on the large scale, and then only for a definite purpose. It is sometimes necessary to bring the heavy artillery into action alone at long range, to enable the field batteries to advance to closer range.

(2). Place where the artillery is to come into action. This includes the general line of the fire positions, determined, if necessary, by regard to cover; construction of entrenchments, and allotment of roads by which the artillery is to advance. On account of the special action of light field howitzers, the positions for these may have to be specified. It is desirable to post them in the centre in order that their fire may be available in all directions. The same applies to heavy howitzers, which should, if possible, be brought up so close that they can fulfil any tasks required of them without shifting their position.

(3). Tasks to be fulfilled. See paragraph 132.

(4). Time at which fire is to be opened, specifying whether fire is not to be opened till the bulk of the artillery is ready, or without regard to this, and as soon as possible.

How far the above matters are to be embodied in the order to bring the artillery into action, depends entirely on the conditions. In a cavalry action this order will often be limited to a few words.

73. Included in the first deployment is the bringing up of the *ammunition columns* and holding them in readiness. This is carried out as follows:—

(a). The G.O.C. orders the columns to be brought up to a given place at a given time and held at the disposal of the officer commanding field or heavy artillery. Disorder would ensue if each unit were to bring up its own column.

(b). In all engagements in which the expenditure of ammunition will be large, as in the attack or defence of a prepared position, the ammunition must be in readiness before the artillery

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open fire. Therefore the order to bring up the columns must be given simultaneously with that to hold the artillery in readiness.

(c). In battles of encounter the ammunition cannot be brought up till the combat has commenced; the order to bring up the columns must be given simultaneously with that to bring the artillery into action.

74. If "*artillery*" *ammunition columns* are already at the disposal of a division at the beginning of the engagement, they are to be posted behind the fighting line ready to issue ammunition to the light columns. In urgent cases they are handed over to the commander of the field or heavy artillery to supply ammunition direct to the fighting line. "Artillery" ammunition columns which do not arrive till the battle is over supply direct to the batteries.

GENERAL PROCEDURE OF THE ARTILLERY.

75. It makes no difference to the artillery commanders whether the G.O.C. first orders the artillery into a position of readiness and then orders them into action, or whether he gives the latter order straight away. For them, the execution of the order falls under the general description of *deployment*. This deployment includes bringing on the artillery from the column of march, forming up in line of smaller columns, taking up the position of readiness or anticipation, and forming the artillery firing line. (This latter is termed "deployment" in the narrow sense).

76. The object of the above procedure is to bring the artillery units, still limbered up, close to the places at which they are to come into action. The order for these operations, styled in brief the "readiness" order, is to be given early, if the batteries are to be ready to open fire in good time. It must be remembered that, for instance, in the column of march of an infantry division the artillery brigade commander, riding at the head of the advanced guard, is 2,200 yards from the artillery of the advanced guard, 5,500 yards from the artillery of the main body, and 8,800 yards from the heavy artillery when he receives his orders. It takes considerable time merely for the artillery to trot up and deploy on a level with the head of the advanced guard. To this must be added the time taken in sending back the orders, though this may be reduced by signalling back the order to trot. In a deployment by daylight it is not usually necessary to carry out any preliminary reconnaissance before giving the order to take up the position of readiness, but the orderlies who carry the orders back, who should on this account be officers, must reconnoitre the roads by which the artillery are to advance and deploy, and shew the units the way. If the subordinate commanders or the observation wagons are to be brought up, special orderlies must be detailed to lead them. But if the whole process of deployment is carried out by night, it must be preceded by a careful daylight reconnaissance, and also by steps taken to indicate the way, possibly including preparations for lighting the roads.

77. The establishment of the firing line, or deployment in the

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narrower sense, includes occupying the position, unlimbering, finding the line, and preparation for opening fire; simultaneously with this there proceeds the preparation of the observing stations and the establishment of telephone communication. The order for this (known as the "deployment" order) will usually not be given till the units have arrived at the position of readiness. It is only in urgent cases that the units are seized upon before reaching the position of readiness and led straight into action. The formation of the firing line must always be preceded by a reconnaissance by the commanders, carried out while the batteries are coming up. When positions are occupied by night they must be reconnoitred before complete darkness sets in.

78. There are a few other measures connected with the deployment, which must be carried out so as not to impede the advance of the units. These are:—

(a). Establishing those fighting communications for which the artillery telephone equipment does not suffice.

(b). Scouting and reconnaissance, including the service of protection.

(c). Arrangements for replenishing ammunition.

(d). Making arrangements for the treatment of the wounded, or sanctioning such arrangements.

79. An artillery commander who orders a deployment will usually command it himself; he will himself make the necessary reconnaissance, and give his orders and instructions on the spot. Exceptions to this are only justifiable when time presses or when only a part of the artillery is to be deployed. In such cases the commander issues instructions rather than orders, and leaves the reconnaissance and the details of time and place to the subordinate commanders.

80. The commanders of the light ammunition columns and of any "artillery" ammunition columns allotted to the force have not only to reach the positions of readiness assigned to them by the G.O.C. in good time, but also to establish communication on their own account with the fighting line and especially with the C.R.A. It is, therefore, important that they should reconnoitre their roads early.

THE ARTILLERY BRIGADE COMMANDER.

81. The brigade commander is with the G.O.C. till the deployment commences and assists him in his reconnaissance in matters bearing upon the deployment of the artillery. He then receives an order or orders as described in paragraphs 72 and 73. In most cases he will have the advantage of having his immediate subordinates, that is, the commanders of field artillery regiments and of heavy artillery, at hand, so that he can at once give them orders as to the bringing up, holding in readiness, and deployment of their units. A preliminary reconnaissance for these purposes is not necessary except when the operation is to be carried out in the dark. In the day time it will usually suffice if the orderly officers, on their way back, reconnoitre their roads.

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82. In framing the *order for readiness*, the following points must be considered:—

(1). General idea of deployment of the field artillery regiments and heavy artillery. For the former it is often sufficient to say which is to be on the right and which on the left; for the heavy artillery the approximate situation of their position should be given.

(2). The road to be taken by each field artillery regiment and by the heavy artillery and the point on which each is to march. It is not of much use to say which side of the main road a unit is to take when trotting forward, as units branch off to different sides. But care must be taken that a regiment in rear, or even the heavy artillery, does not trot on too soon and push in beside a regiment in front of it.

(3). Posts of the commanders of field artillery regiments and heavy artillery, reconnaissances to be carried out by them, place where they are to receive the order for deployment.

The process of getting the artillery into position of readiness will be much expedited if, simultaneously with the order, the brigade commander sets the whole of the units trotting by signal.

83. Next comes the reconnaissance of the positions to be occupied, as described in paragraphs 45 and 46, in which the commanders of field artillery regiments and of the heavy artillery take part. On the result of this reconnaissance the brigade observing station is established by the adjutant, and the order for deployment issued to the field artillery regiments and heavy artillery. The observing station should not be in the artillery firing line; it should allow of a good view and be as near as possible to the divisional commander's post.

The *order for deployment* is given either to the assembled commanders or to each individually. When giving this order the following points must be considered:—

(1). Situation as regards our own force and the enemy, and intention of the G.O.C.

(2). Details as regards positions and method of occupying them, including:—

(a). Nature of the positions, whether firing positions or positions of anticipation, or, under certain circumstances, some units are still to be in positions of readiness. Grouping of units, cover, and, for units still held in readiness, reconnaissance of probable fire-positions.

(b). Delimitation of ground; places to be kept clear as observing stations for the heavy artillery.

(c). Roads to be used and method of occupying the positions.

(3). Details as regards the combat and the preparation for it (see also paragraph 142):—

(a). Delimitation of the target areas.

(b). Tasks which will presumably have to be performed in these areas, and eventual co-operation of the heavy artillery.

(c). Special tasks to be performed outside the allotted target areas.

(d). Instructions relating to gunnery (only in exceptional cases).

(e). Opening fire.

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(4). Post of the artillery brigade commander. Communication between him and the commanders of field artillery regiments and heavy artillery.

84. Cases may occur, especially in situations of unexpected encounter, which require the artillery to be brought into action as quickly as possible. Or extension over a very wide front, in defence or in a holding action, or difficulties of ground, may impede the reconnaissance. In all these cases the brigade commander is obliged to omit his own reconnaissance and to leave everything in the hands of his subordinate commanders. In such a case he issues an order which is more of the nature of an instruction to deploy, and which should briefly embody the following points:—

(1). Situation as regards our own force and the enemy, and tactical object of the General Officer Commanding.

(2). Delimitation of the deployment areas and allotment of roads.

(3). General tactical tasks and preliminary allotment of target areas.

(4). Post of brigade commander.

Simultaneously with this order the units are set in motion at a trot by signal. It will usually only be necessary to deploy the leading regiment in this manner; the remainder of the brigade are deployed in the regular manner, with or without the use of a position of readiness.

85. After the order for deployment has been issued, the following matters have to be attended to:—

(a). Establishment of communication with the G.O.C., unless an officer has from the outset been left with him for this purpose, and with the artillery brigade commanders of adjoining divisions, in order to arrive at an agreement with them as to the delimitation of target areas. This is important.

(b). Arrangements for reconnaissances and scouting. These are carried out partly by sending out the brigade officers' patrols, partly by delegating them to the field artillery regiments and heavy artillery. As a general principle, the field artillery regiments and heavy artillery will undertake reconnaissance and scouting in their own areas, and to the front and rear of their positions on their own initiative, and therefore the brigade commander's arrangements are limited to special matters such as the reconnaissance of positions for a retirement, and obtaining a flank view into areas concealed from the front.

(c). Arrangements for replenishment of ammunition. The brigade commander has only to consider the field artillery. As regards the light ammunition columns, his arrangements include sending to fetch the columns posted in readiness by the G.O.C. and leading them to the units; regard cannot always be had to whether the column belongs to the same regiment. Or else directing the regiments to take over their columns at a certain place. As regards "artillery" ammunition columns allotted to the brigade, these have to be com-

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municated with and instructions issued as to when and where they are to be ready to supply ammunition.

86. Finally, the brigade commander proceeds to his observing station, informs himself as to the progress of the combat in the meantime, and takes up the observation himself.

THE COMMANDER OF THE REGIMENT.

87. Until the deployment, the O.C. regiment will be with the brigade commander and will be acquainted with the situation. The first duty which he will have to carry out will be to bring up his regiment and hold it in readiness as ordered by the brigade commander (paragraph 82 or 84). A special reconnaissance for this purpose will only be necessary for night operations; in the day time the orderly officers, as they ride back, can reconnoitre the roads. The points to be borne in mind by the regimental commander in issuing his orders are similar to those given in paragraph 82.

88. When the "order for readiness" has been carried out, his next duty is to bring the regiment into action in accordance with the "order for deployment" (paragraph 83 or 84). He has first to reconnoitre his ground or complete this reconnaissance (paragraphs 45 and 46). On the result of this reconnaissance, he selects his observing station and orders his Abteilungen into action. He sends for his Abteilung commanders to receive this order, if they have not already been fallen out from the column of march. In framing his order to deploy, the points to be borne in mind are similar to those given above for the brigade commander's order for deployment (paragraph 82).

89. In cases where the regimental commander is unable to reconnoitre himself owing to lack of time, wide extension of front, or difficult ground, he must give full discretion to his Abteilung commanders. His order then takes the form of an instruction to deploy, and embodies the points given in paragraph 84.

90. After the order to deploy has been given, the matters regarding communications, scouting, &c., given in paragraph 85 are to be attended to.

ABTEILUNG COMMANDER.

92. The Abteilung commander with his staff must arrive at the position in good time, as he has to do the greater part of the reconnaissance himself. He should usually, therefore, be fallen out to the O.C. regiment from the column of march, and this should rarely be deferred till the Abteilung has arrived at the position of readiness. It is best to make it a general order that the Abteilung commanders are to ride forward as soon as the order to trot is received. (See paragraph 67).

The Abteilung commander, having received his orders (paragraphs 88 and 89) proceeds to his position and reconnoitres as in paragraphs 45 and 46. As soon as he has acquainted himself with the general lie of the position (for which a glance round will often suffice) he sends his orderly officer to bring up the Abteilung. His instructions to the orderly officer include the following points:—

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(a). On what road to find the Abteilung.
(b). Where to lead it to, situation of position of readiness, and in what formation it is to deploy. In concealed positions the orderly officer may also have to lead the batteries into their fire-positions.
(c). Whether the battery commanders and telephone squads are to come on.

93. The Abteilung commander then completes his reconnaissance. It is desirable, if this can be done unseen by the enemy, to mark the flanks of the battery positions either by men of the staff, or with banderols. The observing station is then established and the batteries ordered into position.

The observing station should give a good view of the target area and immediate foreground, and should be as close as possible to those of the battery commanders. In concealed positions the three battery commanders and the Abteilung commander can usually observe from the same point.

The orders to the battery commanders are usually given in the centre of the position or at the observing station. They include the points given in the brigade commander's order for deployment (paragraph 82) and more precise instructions as to the entrenchments to be constructed and the method of occupying the position, with special reference to avoiding dust. The orders for the combat include:—

(a). Pointing out targets (it is advisable to use aiming posts or an Abteilung auxiliary mark).
(b). Tactical tasks, especially as regards the method of fire and expenditure of ammunition.
(c). Gunnery instructions such as ranges, angles of sight, whether one battery is to range, nature of projectile, &c.
(d). Whether to await orders before opening fire. It is best to make it a standing order that batteries are to report when ready to fire, unless specially ordered to open fire independently.

The Abteilung commander will further specify the place from which his orders will be issued, the means of communication with him, and, in concealed positions, the battery observing stations.

He has then to see to the matters detailed in paragraph 90, including communication with the officer commanding regiment, scouting, ammunition supply and disposal of wounded.

95. Finally, the Abteilung commander proceeds to his observing station, informs himself as to the results of the target reconnaissance, and takes up the observation himself.

96. The commander of the *horse artillery Abteilung* of a cavalry division proceeds in similar fashion. But his procedure may be modified by the special conditions of the cavalry combat and by the fact that he is an independent commander.

FIELD ARTILLERY BATTERY COMMANDER.

97. The battery commander with his staff will usually be fallen out at the Abteilung position of readiness, and not earlier, except in urgent situations, especially with the advanced guard. In the latter

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cases he should take his mounted telephonists. On receipt of his orders (paragraph 93) he proceeds as follows.

98. In "*deliberate*" *situations* he just orders the observation under-officer to observe the target from a place which he designates. He himself, accompanied by the under-officer detailed as target indicator, reconnoitres the position and approaches (usually dismounted) and marks the flanks. By this time he receives information from the observation under-officer as to the target, and can then decide as to the position of the observing station, the method of occupying the position, and the ranging procedure. The battery then comes into action. This includes:—

(1). Preparation for opening fire, which may include preparation of emplacements and observing station, telephone communication, and finding the line from the concealed position. The section commanders are usually called up for instructions, or these may be given to the senior subaltern. When much digging or clearing has to be done, working parties should come up with the section commanders. The observing station is entrenched or otherwise prepared under the supervision of the observation under-officer. The battery commander determines the line, in a covered position, with the assistance of the director squad. It is to be noted that the B.C's director need not necessarily be set up at the observing station.

(2). Advancing into action, by the open or concealed method. An intermediate method is unlimbering by surprise, when the battery emerges from cover and does not show itself till it unlimbers.

(3) In *urgent situations* the foregoing procedure must be simplified and shortened. Usually an orderly is sent to point out the position to the battery, which advances straight into action. The battery commander quickly reconnoitres as to the most important matters, turns back to his advancing battery, and leads it into action. This procedure is frequently used in advanced guard and cavalry actions.

100. In *concealed positions*, when the observing stations are further distant, the Abteilung commander either sends an orderly officer to superintend the occupation of the position, or he directs that the senior subalterns be called up to receive instructions.

The battery commander leaves No. 2 director in the position and lays No. 1 director on it from the place where it is set up, taking the displacement into account beforehand, if possible, and directs that the angle thus obtained be transferred to the gun-sights. Or he may, if he chooses, use the compass attached to the director.

In the meantime the telephone cable is laid from the observing station to the battery; when this is done, the battery commander orders the battery to make ready to fire.

BATTALION COMMANDER OF HEAVY ARTILLERY.

101. Until the deployment, the battalion commander will be with the brigade commander and will be acquainted with the situation. Thenceforward his duties will be the same as those of the commander of a field artillery Abteilung, except that he has to provide for his observation wagon and observation station. The latter requires special care in selection; it must command an extensive

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view, to avoid the necessity of shifting it on a change of target. In this the battalion commander is assisted by his observation officer, so that he can take his adjutant with him when selecting the battery positions.

105. The procedure of the *heavy battery commanders* is as given above for the concealed position in the field artillery, except that the battery positions will usually be further distant from the regimental and battery observation stations. Targets are usually pointed out with reference to a regimental auxiliary mark. Telephones are laid out under the supervision of the battery observation officers. It may be necessary to detail working parties to improve the roads into the position.

107. It is only in exceptional cases that a heavy battery comes into action in the open. In such a case the battery commander himself brings the battery into action and prepares to open fire.

CHANGING POSITION.

108. A change of position may be undertaken for 3 reasons:—

(a). When the G.O.C., of his own accord, changes his tactical plan.

(b). When the situation changes with the progress of the combat.

(c). When the C.R.A. considers that he can increase his own fire-effect or reduce that of his adversary.

In all these cases the order to change position (or at least the sanction for it) should come from the G.O.C., since such a change alters the "framework" of the combat.

109. When the G.O.C. orders a change of position, the following points should be embodied in the order:—

(1). How many of the artillery units are to change position, naming them if necessary.

(2). Instructions as to moving from the old position so far as this affects the combat in general. For instance, whether it is important or no to leave the position without the enemy's knowledge, and whether the change is to be made simultaneously or by echelons.

(3). General designation of the new position, stating its situation and whether open or concealed.

(4). Tactical objective in the new position.

(5). Time at which fire is to be opened (in exceptional cases only).

110. In cases where an artillery commander changes position on his own initiative, this must be reported at once, in some cases direct to the G.O.C.

111. Changes of position interrupt effect, and should not be undertaken unless necessary. On the large scale they should, if possible be carried out by echelons. With heavy artillery it is often possible to shift the observing position forward instead of shifting the guns.

GENERAL PROCEDURE OF THE ARTILLERY.

112. The G.O.C. cannot always order a change of position, and artillery commanders must, when necessary, change position on their

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own initiative. This will usually be done in the following cases:—

(a). Small alterations of position to improve our own fire effect or to avoid the enemy's fire.

(b). When acting in close support of an infantry attack.

(c). In pursuit, when a position has been carried.

(d). In retreat, when it is obviously useless to hold on to a position any longer.

In heavy artillery, a commander may have to change his position in consequence of the rapid forward progress of the troops (especially in pursuit) or of an unexpected retirement.

Although changes of position may have to be carried out on the initiative of subordinate commanders, yet on arrival at the new position the higher commanders must at once intervene so as to secure at least the orderly direction of fire.

113. Changing position includes leaving the old position and coming into action in the new. As in the old position the battery will be broken up, the limbers being away, and as the telephone cable is unrolled, several preparations will be necessary before moving. It is as well to adopt a short word of command, familiar to the batteries, covering this procedure.

The deployment in the new position requires less reconnaissance than before, as the conditions are known by this time. But owing to the haste with which the manœuvre is performed, it is especially important that the Abteilung commander should ride forward at once, the battery commanders following as soon as their batteries are trotting. When changing position to the rear, the C.R.A. rides back, and the remaining commanders do not follow till their units are out of danger. They send back orderly officers to reconnoitre the position.

114. Large bodies of artillery change position by echelon. Each echelon moves either at a specified time or by order.

115. An artillery commander who orders, or is ordered to undertake, a change of position, carries it out himself, making the necessary reconnaissance and giving his orders as when first coming into action.

116. In cases where a change of position can be anticipated with some certainty, a higher artillery commander, without *ordering* the change, may give instructions to prepare for it and carry it out when necessary. This is especially advantageous when the decisive period of the combat is at hand, as there is no waiting for orders, and yet there is no disorderly crowd of batteries pressing forward in pursuit.

BRIGADE AND REGIMENTAL COMMANDERS.

117. The systematic change of position of a whole artillery brigade is of rare occurrence, except when breaking up a combat. Changes of position by regiments (of six batteries) are of more frequent occurrence.

The procedure of the regimental (or brigade) commander is as follows:—

(a). Preparations, including sending the ammunition columns back for a retirement, or warning them to advance for an advance.

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(b). Orders, to be sent to each subordinate unit, usually verbally. Such an order contains, in brief words suited to an orderly's understanding, the following matters:—

(1). General direction, advance or retreat.
(2). Method of advance (or retirement) from old position, whether simultaneously or by echelon.
(3). Road to be taken, and where to.
(4). Post of the O.C. regiment in the new position.

(c). The O.C. regiment then rides forward to the new position and reconnoitres it with the assistance of the officer of the patrol previously sent in this direction.

(d). Order to come into action, given to the subordinate commanders, who have ridden up in the meantime. In a retirement, this order is given to the orderly officers who have been sent back. It embodies:—

(1). Situation, and intention of G.O.C.
(2). Details of position and method of occupying it.
(3). Instructions for the combat.
(4). Post of the O.C. regiment.

118. Changes of position by a portion of a brigade or of a regiment will frequently occur. These are usually only ordered, not led, by the O.C. brigade or regiment, as this officer will be busy observing the combat and supervising the fire-direction of the remainder. The order for the change of position embodies the points given in paragraph 117.

119. For such changes of position as are expected, but which require to be carried out on the initiative of commanders when the moment arrives, it is as well to issue preparatory instructions.

For a pursuit, the units which are to advance immediately to the captured position are to be named; these are the units nearest to the point of assault, or which are most conveniently situated, with regard to the roads, to reach it. The remainder wait till fire is opened from the captured position.

For a retreat, the units which are at once to retire to covering positions are to be named.

ABTEILUNG COMMANDERS AND BATTALION COMMANDER OF HEAVY ARTILLERY.

121. An Abteilung usually takes up its new position as a body, a howitzer battalion by echelons.

122. The *preparations* include:—

(a). Sending on officers to reconnoitre, or in retreat, to receive orders.
(b). Packing up (at least partly) the telephone line and observation wagons, and sending on the mounted telephonists and heavy artillery observation wagons.
(c). Bringing up full ammunition wagons, or, in retreat, sending all ammunition wagons and first-line transport to the rear.
(d). Bringing up limbers.

123. The order to change position includes the points given in paragraph 117 (b).

124. In the advance, the commanders ride forward as soon as

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the order to change position is received; in a retirement, they wait till their commands are out of danger.

125. When changing position forwards, the batteries usually move straight from the old to the new position. In a retirement it is usually necessary first to take up a position of readiness in order that the new position may be occupied in an orderly manner.

BATTERY COMMANDERS.

126. Unless the old target has disappeared, fire on it must be kept up till the last possible moment. Therefore a subaltern (in heavy artillery the observation officer) is detailed to continue the fire when the battery commanders ride forward.

The preparations for the change of position, and the execution of the manœuvre, are given in paragraph 122.

When necessary, the guns are to be run back. It is desirable to await a pause in the enemy's fire before bringing up limbers. The guns and wagons are limbered up and move off either in column, or else independently, when each moves off to a place of assembly.

130. The new position is occupied in the same manner as the original position, but quickness in coming into action is usually necessary.

A Russian view of the support of the decisive Infantry attack by the Artillery—Pack Artillery recommended.

By Captain A. Engel, in the " Sbornik Statjej."

Mitteilungen über Gegenstände des Artillerie- und Geniewesens, No. 10, 1910

A great deal has lately been said and written about the mutual support and closer co-operation of the various arms. The most important phase of this is the universal demand for the support of the infantry attack by the artillery, including the advance of the artillery to the shortest possible ranges.

The solution of the problem of the artillery "accompanying" the infantry has been made harder by the increased range and effect of field gun fire and is not to be found in these days of powerful Q.F. guns, any more than it was formerly, in the mere insertion in the " Field Artillery Regulations " of a demand for "accompaniment." Such a demand must be capable of being fulfilled in war.

The experience of the Russo-Japanese war has shown that on neither side was there an instance of the Field Artillery accompanying the attacking infantry. In fact on the Russian side there was hardly any question of effective co-operation or support, as the infantry was usually 4 to 5 kilometres in front of its artillery. In spite of this,

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most " Field Artillery Regulations " solve this important problem by a more or less circumlocutory demand for " accompaniment " of the infantry by the artillery.

Thus the German " F.A. Regulations " say in para. 471 :—

" While the infantry work their way forward to assaulting dis-
" tance, the artillery must unceasingly co-operate in keeping down
" the hostile infantry fire. . . . . Single batteries accompany the
" attack as closely as possible. This gives moral support to the in-
" fantry and may prevent retirements."

The Austro-Hungarian " F.A. Regulations " say in Part III., Vol. 4, para. 81 :—

" In order to support the attack, to infuse new life into the
" advance, to secure rapidly all successes gained by the infantry, and
" to offer a rallying point in case of any retirement it will be advis-
" able, wherever the circumstances are favourable, for single batteries
" to accompany the advance of the infantry to close ranges and to
" bring specially heavy fire to bear on those portions of the front of
" assault which offer the greatest resistance. Should these batteries
" suffer heavy losses or even total destruction, they have nevertheless
" rendered invaluable services and achieved a glorious end."

The French " F.A. Regulations " are very cautious on this point, saying in para. 635 :—

" As soon as the movement of the attacking infantry begins each
" portion of the artillery must be allotted its definite task.

" The various operations, the carrying out of which during the
" course of an attack must be provided for, are :—

" 1. Continuing and re-starting the fire against the hostile
" artillery. The batteries allotted to this task—counter-batteries—
" will usually remain in the positions they occupied during the pre-
" paration of the attack.

" 2. Destroying the obstacles which hinder the advance of the
" infantry (walls, entanglements, &c.); directing fire against the de-
" fenders of flanking positions and against the reserves and counter-
" attack troops behind the position.

" The batteries allotted to this task—infantry batteries—will be
" temporarily withdrawn from the divisional artillery. They will
" change position if they can thus gain an advantage in carrying out
" their task. Especially will flanking positions be found for certain
" batteries from which they can bring oblique fire to bear on the
" ground to be crossed by the infantry, and support the attacking
" columns with their fire to the last possible moment. Some of these
" latter batteries may be entrusted with the task of arriving on the
" captured position as soon as possible after the infantry, so as to
" continue their fire on the retreating enemy and repel any possible
" counter-attack."

The French "F.A. Regulations," which are based on the opinions of General Langlois, and in the opinion of the Russian author of this article form a pattern for all other " F.A. Regulations for Q.F. Guns," have passed through three editions since 1901, and these editions are very alike in all essentials except the part relating to the " accompaniment of the infantry in the attack." Obviously the first war experience with Q.F. guns—the Russo-Japanese war—has caused

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the French gunners to alter this part of the Regulations correspondingly. This para. of the French Regulations in 1903 (before the Russo-Japanese war) and in 1905 (immediately after the war, and consequently before its experiences could be appreciated) ran as follows:—

"Immediately before the advance of the attacking infantry, the "artillery which has taken part in the preparation is to be divided "into two parts.

"The first part, which is temporarily withdrawn from the divi- "sional artillery, accompanies the attacking infantry, and in order at "all times to afford material and moral support it must:—

"1. Follow the infantry in echelons and by alternate advances "and in case of need fire at the enemy from the very shortest ranges.

"2. Pay no attention to the hostile artillery should it begin to "open fire again as this is the concern of the batteries of the second "part.

"3. Break down as rapidly as possible all opposition to the "advance of the infantry. To do this it may assume any formation "suited to the ground without entirely breaking itself up.

"4. Temporarily occupy flanking positions so as to be able to "continue its fire to the last possible moment and thus to give to the "attack that "entrain" indispensable to the attainment of success, "and to give itself the power of immediately dealing with counter- "attacks.

"5. Move as rapidly as possible to the hostile position as soon "as the infantry capture it so as to complete the rout of the enemy "and prevent any counter-atatack.

"The batteries of the second part remain as a rule in the posi- "tions which they occupied during the preparation of the attack, and "their tasks are . . . . . &c., &c."

The comparison of this paragraph of the French "F.A. Regulations" in two editions, issued only two years apart (1905 and 1907), enables us to see the reason of this rapid change of mind on the subject of the "accompaniment of the infantry by the artillery" on the part of the chief French artillery officers. In the earlier edition, which was remarkable throughout for brevity and clearness of expression, the principle that the artillery was bound to accompany the infantry was laid down with no limitations or lack of decision. In the new edition this principle is hardly to be traced in the enumeration of the duties of infantry batteries. It can only be read between the lines of the concluding sentence of para. 635—"Some of these "latter batteries may be entrusted with the task of arriving on the "captured position as soon as possible after the infantry,"—for the artillery can only occupy the position taken by the infantry as soon as possible after the latter take it if they follow it very closely, *i.e.*, accompany it.

It would be interesting to know the view of the Russian "F.A. Regulations" on this point, but unfortunately no such Regulations have been issued since the war.

The more closely we look into this question of the artillery accompanying the attacking infantry, the more we realise that under the conditions of modern warfare such a demand would be least capable of fulfilment just when it became most desirable.

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As regards vulnerability under modern rifle and shrapnel fire, artillery can stand no comparison with cavalry or infantry. Infantry, though a slow mover, is wonderfully adaptable and can find cover on almost any ground. Cavalry offers a far larger target but possesses great speed. Artillery, on the other hand, offers an immense target, cannot adapt itself to the shape of the ground, and does not possess great speed. With the artillery the loss, or even the accidental fall, of a single horse will stop a gun, and under unfavourable circumstances this may check an entire column. Such a halt under hostile fire would be fatal.

The great losses which the artillery must expect at close ranges can only be justified by a corresponding advantage to the other arms. An approach to 2000 yards from the enemy is quite sufficient to ensure good results from modern Q.F. guns. Although closer ranges give even better results on the practice ground, in warfare the guns would then come under effective rifle fire, and also lose the power of firing over the heads of their own infantry.

If in spite of this the principle of the artillery accompanying the infantry still seems desirable, this must be due to a desire to give moral support to the infantry and rapid assistance in case of a counter-attack. However the opposite is likely to be the effect, for the guns may easily be put out of action, or, what is even more probable, find it impossible to supply themselves with ammunition. Another point is that owing to the flat trajectory at short ranges cover is difficult to find, and the dead ground due to it may destroy the value of the artillery support, while guns in the open will be exposed to the entire hostile fire. This forms a truly vicious circle.

In spite of the experience of the Russo-Japanese war, the desire for artillery to accompany the infantry cannot be entirely put on one side, and as in so many cases the adoption of the golden mean will probably solve the weighty problem for us. Let us enquire further into the matter.

The first solution lies in the creation of automobile batteries. So far experiments in this direction have only been made with balloon guns.

The second solution, which was proposed immediately after the Russo-Japanese war, consisted in replacing artillery for this purpose by machine guns, but this turned out to be a failure. Machine guns can follow infantry anywhere and offer considerable material and moral support, but in point of range and for the purpose of securing a captured position they cannot compete with artillery. Such a position would immediately come under the heaviest fire from the enemy's guns. Against them machine guns would be useless, even if they could get the range. General Langlois' words are decisive on this point:—Two arms (infantry and machine guns) are always stronger than one (infantry) and three arms (infantry, machine guns and artillery) are always stronger than two (infantry and machine guns).

The third solution, which is coming more and more to the front, consists in the use of pack artillery. The use of pack animals is the key of the situation.

Almost the first to point to this solution was Major Knapp, R.G.A. ("Journal of the Royal United Service Institution," February,

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1906, and June, 1907). Major Knapp was not the originator of the idea, for as he himself points out, the Japanese used pack (mountain) artillery for the purpose, as they found out the impossibility of using wheeled artillery. They sometimes had mountain guns in the most advanced infantry lines, and on certain occasions the Russians also used mountain guns in the same way. Major Knapp's ideas on the use of pack artillery have been largely drawn on in the English "Field Artillery Training" (1908). A few extracts from this book will show how carefully and thoroughly the English handle this matter. Page 216—Attack—says:—

"As the attack progresses it will be necessary for the artillery "to co-operate closely with the infantry; such co-operation with an "infantry attack is not possible at distant ranges, unless the country "is unusually open. Guns which in the early stages of an attack "have been in concealed positions at distant ranges must, therefore, "be moved forward gradually by batteries, or even sections, covered "by the fire of those still in action, till they reach positions from "which close co-operation is possible. But such changes of position "are attended with considerable risk unless it is clear that the "enemy's artillery have been overpowered, or that the ground to be "traversed is concealed from his view. When this is not the case "the movement may have to be carried out under cover of darkness."

In the Appendix on mountain artillery this idea is further enlarged upon. Thus:—

"The employment of mountain artillery is not restricted to "mountainous country; for infantry now, more than ever, require "close and effective support throughout the attack, and as pack "animals can go practically anywhere that an infantry soldier can "go without using his hands, batteries of mountain artillery are "peculiarly suited to work with infantry in difficult country of any "kind.

". . . . . and as the latter (*i. e.*, pack animals) can get "cover from hedges, undulations of ground, crops, scrub, &c., which "will conceal a man standing upright, batteries of mountain artillery "will often be able to work their way forward on a battlefield without "attracting attention, where the movement of wheeled artillery could "not pass undetected.

"Mountain batteries possess, too, the power of working in widely "extended order, and so have a greater chance of getting across a "fire-swept zone than the most mobile form of wheeled artillery, "each vehicle of which offers a large target and runs the risk of "destruction if an animal is shot. An animal shot does not bring a "gun carried on pack animals to a standstill, and if a casualty cannot "be replaced by a spare animal, it will generally be possible to bring "on by hand any portion of the equipment which is left behind.

"Mountain batteries supporting an attack will move with the "infantry and take up positions to assist the advance wherever neces-"sary. . . . . .

"Nor is the utility of mountain artillery confined to supporting "the infantry in the attack, for in the defence of woods, during turn-"ing movements in broken or hilly country, in temporary forward "positions occupied by the defence, and in counter-attacks or rear-

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" guard actions, artillery which is independent of roads and essentially " mobile will often be able to render valuable service."

The principle of (even wheeled) artillery accompanying the infantry attack is a logical and possible one, and should be retained in the training manual. It is only a question of how it should be carried out.

The Russian author recommends the following attitude for the new Russian " Field Artillery Regulations ":—

" As soon as the infantry begin to advance, single batteries or " sections will be detailed to accompany the attack to within the " closest possible ranges. Wheeled artillery advancing under effec- " tive shrapnel or rifle fire is liable, except under favourable circum- " stances, such as cover from view, good communications, rain, snow " or fog, to be put out of action without accomplishing its mission. " Hence this duty will usually fall to the pack (or mountain) batteries."

Such a solution would be a purely theoretical one unless the following practical measures were also taken:—

1. Enlarge the views of the troops as to the uses of mountain artillery and in future call it pack artillery and pack batteries.
2. Allot pack batteries to each division.
3. Raise the proportion of pack batteries to field batteries.

What should this proportion be? Certainly not too high, as pack artillery is far less powerful than wheeled artillery. The following proportion is suggested:—

Field guns	60%
Field howitzers	18%
Pack artillery	12%
Horse artillery	10%

For Russia, the author proposes a change to four-gun batteries, and distributing the 112 guns of an army corps as follows:—

18 field batteries	(65%)
6 howitzer batteries	(21%)
4 pack batteries	(14%)

The pack artillery would not be exactly similar to the present mountain artillery. It would have to be equally suitable for use in flat country.

T. C. Newton, Lieut., R.F.A.

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Mountain Horse Artillery.

By Freiherr Majneri Kempen, Captain, Austrian Army.

Translated from "Artilleristische Monatshefte," July, 1910.

Every country which is at all likely to have to undertake operations in mountainous country, possesses mountain artillery with portable guns.

Austria-Hungary has indeed gone further and has introduced heavy mountain artillery in the shape of 4″ mountain howitzers. Although these are not actually portable, their narrow wheel track of only 36″ admits of their being driven over the steepest and most difficult mountain roads.

Mountain guns are carried on the march on pack animals.

With a modern pattern gun, four pack animals are required for the gun, one being set apart for the barrel and three for the carriage, which is capable of being rapidly stripped and re-assembled.

Several more are required for the ammunition. In Austria-Hungary there are two animals in the firing battery, carrying 16 rounds each, and more with the first line.

Since it has not hitherto been found desirable to have the barrel in two portions, the weight of the barrel has been limited to about 110 kilograms, since the maximum load for a pack animal, including the saddle, is 150 kilograms. This very much restricts the ballistics of the mountain gun.

The Japanese have adopted the same calibre for the mountain artillery as for field guns, which gives the mountain gun comparatively great shell power, and also makes for uniformity of ammunition. The initial velocity of the shell, and consequently the range, are, however, comparatively small. Austria-Hungary, on the other hand, has a small calibred gun for the mountain artillery, which gives a greater range, at the expense of shell power.

If the infantry is not to be left entirely without artillery support even in mountain warfare, a ballistically inferior gun must suffice. In order to modify this disadvantage, every effort should be made to render the mountain battery highly mobile.

I have always maintained that it is only the fact that the detachments have to go afoot which confines mountain batteries to a walking pace. This view will doubtless meet with a certain amount of opposition and requires explanation.

The load of a pack animal is about 150lbs., and that of a cavalry horse in marching order, with a medium weight rider is about 130 kilogrammes. The difference is, therefore, not so very great.

The elasticity of the rider to a certain extent helps the saddle horse to maintain his equilibrium, which the dead weight of the gun does not do for the pack animal. No one would, therefore, think of galloping with pack animals, but on good ground a steady trot over longish distances could be maintained.

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If then the detachments and drivers were mounted, making the battery into a sort of mountain horse artillery, we should have batteries which would fall below field batteries in shell power it is true, but which would be capable of following the infantry everywhere, and on good ground, of rapidly occupying or changing positions. Such a course would mean a large increase of the horses of the mountain batteries, and in mountainous countries, where the care of animals is always liable to be a difficulty, this is a serious consideration. It must, however, be pointed out that the horses of the detachments and drivers would also be available for carrying ammunition; for they, like the pack animals, would never be required to move out of a steady trot, and two rounds could easily be carried in the wallets of each riding horse, and thus at least one ammunition animal could be saved per gun. With this arrangement the ammunition supply would still be slightly greater than at present in the Austrian mountain artillery. Taking thirteen riding horses to each gun, including the drivers, Nos. 1, and horse holders, there would be $2 \times 13 = 26$ rounds on the riding horses, added to 16 on the ammunition animal, making a total of 42 rounds per gun in the firing line.

When marching on a broad road everyone would be mounted, the pack animals going as led horses to their respective drivers.

On bad roads the heavily loaded gun animals would require to be led singly, otherwise one driver would lead two horses. Everyone would be dismounted. The gun drivers would hand their horses over to horseholders, the gun numbers lead their own, and if necessary an officer's. The ammunition driver would couple his horse to the ammunition animal.

On approaching the position each horse holder takes the horses of detachment or drivers, and those of officers as required.

The first line would consist of both ammunition animals and riding horses, the former carrying 16 and the latter two rounds each, with a driver to every two animals.

The idea of a horsed mountain battery is nothing new—such a battery is reported to have taken part in the attack on the Russian outposts at Wafangou, but unfortunately nothing is known at present as to its organization or equipment.

Author's Note.—Two mountain batteries with detachments mounted were employed in the suppression of the Herero rising in South-West Africa.

A. C. B. Neate, Lieut., R.G.A.

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Reports, Precis, Translations, Etc.
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Memorial de Artillería.

The issue of this periodical of October, 1910, in referring to an article published in "The Journal of the Royal Artillery," for July 1910, entitled "The Scientific Corps in Spain," which was afterwards translated into Spanish and appeared in the "Memorial" for August 1910, states that the article above named was quoted in the Spanish Parliament at its session of October 17th, in support of a plea, on behalf of the Spanish artillery and engineers, that they should be granted a reasonable proportion of General officers on the fixed establishment.

The matter was brought forward by Sr. Giner de los Ríos, and was received sympathetically by the War Minister, who announced that in future the number of Generals of brigades and divisions proceeding from each arm or corps, shall be in proportion to the number of Colonels which each possesses. As regards Lieut.-Generals, the promotion to this high rank was left to be exercised by selection.

"The Journal of the Royal Artillery" may, we hope, be allowed to congratulate its colleague the "Memorial" on so satisfactory a statement, and to express its pleasure that its humble comments on the subject raised by the "Memorial" in its May number under the heading "Un acto de justicia," should have been honoured by being quoted in support of so important and just a contention.

In the same issue of the "Memorial" there is commenced a reprint of a valuable work which has just appeared, devoted to a succinct account of the campaign of 1909 in and about Melilla, so far as concerns everything connected with the work of the artillery.[1] The "Memorial" proposes continuing this reprint until the entire work is reproduced, and the various parts can then be collected together and bound.

The book itself is a quarto volume of 475 pages, with a separate volume of charts and plans, and four panoramic sketches in colours. It would be hard to find sketches better or more artistically treated than these which are well worth studying as examples of this useful form of military sketching.

The compilation was entrusted by the War Minister to a committee of highly capable artillery officers, presided over by Colonel D. Gonzalo Carvajal, and its object is to present an accurate and illustrated account of the part played by the artillery in the Rif campaign, not only as regards the action of the various artillery units which participated in it, but also to record all details relating to matériel, transport, automobilism, munitions of war, &c.

It would take far too much space to properly review so comprehensive a work as this, and it must suffice for our purpose to note briefly the contents and scope of the compilation, which is prefaced by a short explanatory introduction and a letter from General D.

[1] "Cronica Artillera de la Campaña del Rif, 1909." Madrid—Imprenta de Eduardo Arias. San Lorenzo No. 5. 1910. The book can be purchased at the price of 25 pesetas (£1) at the offices of the Society of Santa Barbara and San Fernando (War Ministry). It has been very kindly presented to the R.A. Institution by the Colonel, Director of the Museum of Artillery, Madrid.

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Jose Marina Vega, the Commander-in-Chief, testifying to the valuable services rendered by the artillery. The book is divided into three parts.

(i.) Narrative of the Campaign.

This commences with a description of the ground, and of the chief characteristics of the Riffians, who constituted an enemy of no mean order. As the account says:—" They are brave and rash, " probably through ignorance; and this valour is the result of selec- " tion, which is absolutely essential to life in that country where the " weaker are invariably annihilated."

There follows a narrative of the various actions fought, notably that of the 18th July, in which the Artillery Captains Royo and Guiloche died heroically at their posts, and by their tenacity greatly helped to save the day. Fighting continued daily with varying results. On 20th July the brave Captain D. Alfredo Rogers fell when defending his guns.

The proportion of guns during this campaign is given as 2 per 1000 men, and it is remarked that the front of attack for each battery was of necessity so wide that it was most difficult to engage all of the numerous and often unimportant objectives distributed thereon. It was, therefore, necessary to batter the targets in succession, and, as these were numerous, it often happened that each Battery Commander received different orders to simultaneously engage them, which necessitated much *sanfroid* on his part in order that he might arrive at the best conclusion.

The works of defence, as well as the positions of the batteries and allotment of men, guns, and ammunition are clearly described and tabulated.

(ii.) The second and third parts are devoted to the experiences of the campaign, including the system of ammunition supply for the army, details of the expenditure of gun and rifle ammunition, armament, rules for fire, details of mobilization of units, with chapters on machine guns, hand grenades, motor transport, statistics as to the mountain batteries, mobilization of the artillery in the Melilla command, &c. There is a chapter devoted to the work carried on during the war by the artillery section in the War Office; and others on the part taken by the Government factories, provision of remounts, &c.

(iii). The illustrations are from photographs and are very good, including one of His Majesty King Alfonso XIII, and another of the Commander-in-Chief of the Spanish army in the Rif campaign. There are also portraits of the artillery officers who fell in the war, and interesting pictures of the batteries on the line of march, in action, &c.

(iv.) The separate volume of plans (32 in number) is very complete. It commences with a general map of the theatre of operations ,which is a reduction of the Government survey, and, by means of sketches on transparent paper which are intended to be superposed on this map, the positions and situations at various periods can be readily followed. There are also many prospective (panoramic) views of the country showing artillery positions, &c.

A satisfactory feature of the campaign is undoubtedly the

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admirable opportunity which was afforded by the war to test practically much which up to that date had only been known theoretically, *e. g.*, the value of the new Schneider *matériel* for the field artillery and the arrangements for harnessing and horsing. The practical results proved the correctness of the selection and preliminary tests. Similarly the mobilization instructions worked out in the Artillery Section of the War Ministry for field and mountain artillery bore satisfactorily the severe test of war.

The total artillery casualties during the campaign were as follows:—

Killed and died.—2 Generals, 11 Field Officers, 31 Officers, 208 other ranks.

Wounded.—9 Field Officers, 85 Officers, and 1,457 other ranks.

J. C. Dalton, Major-General, R.A. (retired).

The Type of Gun for Coast Defence.

Translated from "Russki Invalid," No. 281.

In Nos. 224 and 225 of the "Russki Invalid" of this year appeared articles by M. A. Nilus concerning the calibre of guns for coast fortresses, in which the author, after shewing that guns were being built in many countries of a large calibre (14-inch), arrived at the conclusion that it was necessary to construct guns of still larger calibre—guns of the future, which, notwithstanding the rapid developments in ship building, would still be able for many years to come, to contend with the ships of a fleet.

Although fully sharing and welcoming the idea, I for my part, would like to say a few words on the *type* of gun for coast defences.

If we consider the question of the armament of a battleship we see at once that this armament consists entirely of *guns*, that is to say, of long guns possessed of great initial velocity and a flat trajectory.

From this follows the idea that it is necessary to contend with your opponent with a gun of the same kind; on shore, therefore, one finds, almost exclusively, weapons for direct fire—*guns*.

Weapons for high angle fire appear to be only supplementary and hardly come into consideration.

I cannot help thinking that this is all wrong. Guns, according to the established idea, have a tremendous advantage over howitzers in striking power, in their short time of flight, in the extent of their dangerous zone and in their accuracy. But is this so?

Having mounted your gun on shore, the object is to hit the ship in a vital spot; and having pierced the armour, the object is to obtain great destructive effects.

But calculations show that even the most powerful gun of the day (12-inch) with a length of 52 calibres and an initial velocity of

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3000 foot seconds can pierce 11-inch armour at ranges not greater than 7000 yards. But ranges of 7000 yards would scarcely be chosen by battleships. More probably the distance would not be less than 9300 yards, and only after the advantage has been gained by the ship, would it run the risk of nearer approach.

But one must keep in mind that it is almost impossible to hope to strike the ship perpendicularly, that at such ranges, there is a considerable angle of descent (6 or 7 degrees), and that generally the fleet when manœuvring, would keep on a loxodromic curve, *i. e.*, so that its diametric breadth would present to an enemy on the battery a certain definite angle—the angle of its course—of not less than 30°. At such an angle of impact, one cannot hope to pierce armour, the projectiles would glance off.

And so, one must come to the conclusion that it is almost impossible to expect to penetrate armour in actual battle.

But if the penetration of armour was an easy matter, even then armour piercing shells would not show very great destructive power.

In reality, their bursting at the desired spot cannot be guaranteed on account of the difficulty of constructing a suitable fuze; the bursting charge is small, and so the damage sustained cannot be very serious.

The experience of our last war has shown clearly the great effect of a bursting shell, and, of course, the greater the charge, the greater will be the effect.

In guns where great pressures are developed in the bore, the bursting charge cannot be large; it cannot be greater than 10 or 12% of the weight of the shell, generally it will be about 6 or 7%.

Another advantage that the gun has, viz., the short time of flight, is of importance in accurately calculating a prediction of the target's course, both in elevation and deflection.

This superiority of the gun is very noticeable if you compare a gun with a howitzer of the same calibre.

But if you allow for the increase of the calibre of the howitzer in comparison with that of the gun which is obviously possible on account of the relatively small weight of the howitzer, then this superiority of the gun is considerably diminished, although it will still be there.

The dangerous zone, generally speaking, is not of large extent at these ranges of about 10,000 yards, either for guns or howitzers, and therefore the superiority of the gun in this respect has not much significance.

As regards accuracy the gun is generally supposed to be superior, but this is a debateable point.

When firing at a vertical target, each gun is individually more accurate than the howitzer, yet this is not the case, when firing from a battery and at a horizontal target. I will give this example as an illustration.

The probable error in firing from a battery of 3-inch Q.F. field guns is 140 feet, and from the old guns of 1877 pattern, which in certain details (length of bore and initial velocity), approximate to howitzers, this error is 84 feet. Generally the difference between the probable error of an individual gun and of a battery is considerably increased by the increase of the initial velocity.

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But the difference between the probable errors of a gun and a howitzer, in the case of firing from a single gun is not great. That is why, in firing from a battery, the probable error of howitzers can be shewn to be less than that of guns.

In the case under consideration (firing at the ships of a fleet), the ship will present a vertical target to the gun, but a horizontal one to the howitzer. If the dimensions of the target in each be calculated, it will be found that guns have a target of about 1,440 sq. yds., while the howitzers will have one of about 3,550 sq. yds. Nearly three times as large. It is worth while pondering over this.

From what has been said it is, I think, sufficiently plain that a gun scarcely has any superiority over a howitzer with regard to its chance of hitting a ship. The sole advantage that the gun has over the howitzer appears to be in range.

But even the howitzer can attain to a range of 16,000 yards, *i. e.*, to the extreme probable range in battle.

From all that has been said above, it follows that the gun has, generally speaking, no natural advantage over the howitzer. On the other hand, the howitzer has several advantages over the gun.

First and foremost, the howitzer shell can be filled with a large quantity of explosive—up to 25% of the weight of the projectile, which with a calibre of 12-inches gives an actual weight of 240 lbs.

In the case of a gun of the same calibre, the bursting charge cannot be more than 100 lbs.

These figures speak for themselves.

The howitzer can hit the ship in its weakest spot—the deck, and, moreover, the damage will be much more serious, as erections of various kinds are distributed about the deck, turrets, observation posts, &c.

The howitzer being considerably shorter than the gun, will be considerably lighter and, therefore, when of equal calibre will be a more rapid firer. Or for an equal rapidity of fire the howitzer may be of larger calibre, and, therefore, more effective on account of the increase in the bursting charge which varies proportionately to the cube of the calibre. The shortness of the howitzer is of importance again in this respect, that it offers a smaller mark to the enemy's artillery.

The howitzer has a longer life than the gun, because it suffers less from its own discharges. The service life of a 12-inch gun is about 100 shots, but of a howitzer not less than 500.

Finally, the howitzer with its equipment, without taking its longer life into consideration, costs at the very most only two-thirds as much as the gun.

From all these considerations, I must give it as my opinion that the weapon for coast defence is the howitzer. Its calibre should be increased as far as is compatible with a reasonable rate of fire, not less than two shots a minute, which would appear to be easily attainable. Guns of large calibre should be used only in those cases where howitzers appear to be of insufficient ranging power, *i. e.*, in keeping a bombarding fleet at a distance.

A. E. Harrison, Major, late R.A.

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Guns or Howitzers.

Translated from "Russki Invalid," No. 235.

M. D. Kozlovski in No. 231 of the "Russki Invalid" advocated the employment of the howitzer as the principal weapon for shore defences.

My opinion, which has been already published, is that the weak spot in our coast armament at the present time is the great number of howitzers, and I consider myself bound to protest against this new proposal—to exchange valuable long range guns for howitzers.

First of all it should be noted, that battleships of the present day are designed for fighting at very long ranges, at which the trajectory of the most powerful gun will have a big angle of descent.

Thus battleships will receive hits on deck not only from howitzer batteries ashore, but also from long range fire in a purely naval battle. Against such hits battleships are now protected, and they (the hits) are no longer so dangerous as was the case a few years back.

As regards the statement that the howitzer trajectory strikes the deck—a big target—while the gun strikes the side—a very small one—it is certainly not a correct one. At long ranges, guns will also hit the decks, and still retain their superior accuracy. The same percentage of hits that the howitzer obtains at 12 versts (8 miles), the gun will obtain at 18 versts (12 miles).

As regards the superiority of the howitzer shell in size of bursting charge, that will be considerably decreased when we require the howitzer to fire at a range of 16 versts (10⅔ miles); the initial velocity, and consequently, the solidity of the walls of the shell must be increased. There will be no economy in introducing howitzers into the armament, for as the equipment is increased, so will the cost of the battery increase; larger casemates for the shells of larger calibre will be required, the mounting will be no cheaper, and the reduction of expense in the actual gun will be a negligeable amount.

But let us suppose all these objections to be overruled. The main reason why howitzers can never be the chief weapon for coast defence is their slow rate of fire. A coast defence gun which has to deal with a target appearing for only a few minutes must above all excel in rapidity of fire. The nature of the howitzer admits only of the present anti-quick-firing method of firing salvoes at long intervals.

M. Kozlovski is right in this, that a howitzer can be built capable of firing two shots a minute. But in rapidity of fire a howitzer battery must always be inferior to a gun battery. It is only the ignorance of our coast artillerists of the means of attaining to a quick rate of fire which allows them to doubt this. A howitzer shell at long ranges will be a minute or a minute and a half in the air.

When firing at ranges from 12-16 versts (8-10 miles) it is impossible to dispense with a trial shot; all firing at a moving target is based entirely on the trial shot; but the commander of a gun battery will observe the fall of his shot in half the time and can, consequently, commence firing much sooner.

The position of a commander of a howitzer battery is hopeless; he sees the flight of his shells clearly and is doomed, after corrections have been made, to see them for a minute and a half longer, whilst

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he has no power over them as they fly through space. Consequently all the corrections are too late, and these mighty shells are hurled uselessly into space.

I think that generally the preference shewn to howitzers to a great extent is due to the fact, that practice in peace time is carried out against targets moving only at one-fifth the speed that they would in warfare.

On account of the slowness of flight of the howitzer shell, the howitzer must be layed about 700 yards ahead of a ship moving at full speed, which must seriously affect its accuracy.

Generally speaking, the howitzer is not a weapon for firing at a moving target. Try to kill a wood-cock on the wing with a sling—a weapon of the same type as the howitzer.

The coast artillery think too much of their power of sinking the enemy with one shot, and too little of how they are going to hit him.

It seems to me it would be better to leave the dreams of M. Nilus's 14-inch gun and M. Kozlovski's howitzer. We must be content with our 12-inch gun, the best naval weapon. We must not be bloodthirsty, why should we sink the enemy's ships with one shot? The certainty that no admiral will bring his ships within range of a 12-inch shell should be enough

A. E. Harrison, Major, late R.A.

The Type of Weapon for Coast Armaments.

Translated from "Russki Invalid," No. 248.

In No. 231 of the "Russki Invalid" I expressed the opinion that by far the most suitable weapon for coast armaments was the howitzer, the calibre of which should be as large as possible, commensurate with a certain degree of rapidity of fire.

The fundamental reason for choosing the howitzer for coast armaments is the great explosive effect of its shell. That of the gun is far less, and against armour cannot be considered at all. As the choice of the type of weapon must be based on its destructive effect and on nothing else, I beg to submit some examples of actual experience in war.

In our last war, where fighting took place at ranges of only two miles, there was a splendid chance of penetrating armour (the "Pobieda"), but it appears that a bursting shell never once got inside the ship. I cannot, of course, speak of the damage which the ships sustained at the battle of Tsushima as their secrets lie at the bottom of the sea; but what we do know bears out the statement that *there was no penetration of the armour;* there was not only no penetration of the heavy armour, but even the light armour was pierced on extraordinarily few occasions taking into account the enormous number of hits (the case of the "Orel," for example).

The same thing was observed in the Chino-Japanese war, at the battle of the Yalu, and in the Spanish-American war at Santiago.

Once for all the penetration of armour is unattainable with our present equipment, and as the endeavour to accomplish it is respon-

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sible for the establishment of most expensive armaments, which are constantly being renewed, I ask if it would not be better to search for some other solution. There is a solution, namely, the employment of weapons which throw shells of great explosive effect.

Our war experience shows us that a common shell, even if it strikes on the most heavily armoured part, sets up such a concussion that the protecting armour is shattered and cracks appear in the side of the ship, through which water is irresistibly forced.

A very good example of this was the "Retvizan" which on February 26th, 1904, was hit by five common shell, one of them striking on the most heavily armoured part near the waterline, at a range of nine miles; the armour was not pierced, but the concussion was such that a leak appeared which was overcome only with the greatest difficulty.

Hits from armour piercing and common shell may be easily distinguished also in the lightly protected parts by the difference in the damage inflicted.

The common shell causes damage over a surface of 100 sq. ft., driving into the ship rivets and portions of the hull. Besides this it discharges an immense amount of gas heated to an enormous temperature which consumes everything, and envelopes the ship for quite a long time in a dense suffocating atmosphere.

The armour piercing shell with its small bursting charge produces a comparatively slight effect, for even if it does penetrate, it makes an exceedingly small hole and as its burst takes place after penetration, the only effect is a shower of splinters

From these considerations, it would appear that the only possible projectile against a ship is the common shell with instantaneous fuze, as its effect extends over the whole surface of the ship, and *does not depend either on the angle of impact or on the range.*

This then is one consideration which will influence our choice of weapon for coast armaments.

The other is—the range.

At the present time, one frequently hears the opinion expressed that a fleet will engage at ranges of 16 miles, that is, with weapons equal in range to those of present day ships. I think that this is an entire mistake.

Even if it be admitted that at such a range a fleet can throw shells into a fort, it cannot attain to either regular control of fire, or its direction on any particular point, or observation of the most suitable objectives. In short, at such ranges it is impossible for the fleet to fire. The height of the tops from which observations are made are about 100 ft. and from this elevation the visible horizon has a radius of less than 13 miles.

Firing at such great ranges is difficult also from shore batateries. But nevertheless, they are in a better position than the fleet. The point of impact of their shells is shewn by high splashes, and when using sensitive fuzes the bursts are marked by dense clouds of smoke which can be distinguished even against the back-ground of smoke which the movements of the squadron would make on the horizon.

From my own investigations I put the extreme range at from 5-8 miles. Mr. A. S— in N. 235 "Russki Invalid" assumes ranges

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will be 8-10½ miles. Without going into the question in detail, I will merely say that, at ranges approaching 10 miles, it will be impossible to make observations, and it would, therefore, appear more suitable, when deciding what your type of weapon is to be, to consider ranges from 5-8 miles.

As by far the weakest portion of a ship is its deck, it is important to have a weapon which possesses at the range indicated a comparatively steep trajectory. At ranges of about 6-7 miles, a 12-inch gun with an initial velocity of 3000 ft. secs. has an angle of descent of about 8½°, and as these shells are provided with delay-action fuzes they will, on striking the deck, ricochet, and their destructive effect will be absolutely nil. In the case of a howitzer of the same calibre, with an initial velocity of 1500 ft. secs., the angle of descent is 28½°, from which there will be no ricochet. In fact there could not be any, because the fuze is so sensitive that the burst takes place the very moment of impact. (The Japanese shells burst even on touching the water).

Thus a howitzer at fighting ranges will be superior to the ordinary gun.

The disadvantage of the howitzer is its longer time of flight. At the range given (6-7 miles) the time of flight for the gun will be about 16 seconds, and for the howitzer about twice as long. This disadvantage is a very real one, as with the increase of time of flight, comes an increase in errors in calculating movements of the objective, but in spite of this the accuracy of the howitzer is scarcely less than that of the gun.

It is true that if you take the probable errors in two directions it will show less accuracy, but this proceeds entirely from lateral deviation, for in range the probable error of the howitzer will be even less than that of the gun. When a ship is proceeding in a direction perpendicular to that of the projectile, the target is of great breadth, not less than six times the probable error, and consequently the howitzer will scarcely give a less percentage of hits than the gun.

Only in case of movement towards or away from the battery will the ship present a narrower target. But such movements will be exceptional.

The foregoing considerations appear to be of such importance that I do not hesitate to recommend the howitzer as the principal weapon for coast armaments.

As a supplementary consideration I invite attention to the economical advantage which I pointed out in No. 231 "Russki Invalid." The cost of guns and their equipment up to 200 rounds being about half as much again as that of howitzers.

To this I would add that because of the lighter weight of the howitzer, it can be more simply and easily traversed and, therefore, can be fixed more quickly.

The increase in the calibre of guns for battleships, with a decrease in their initial velocity is not a dream. The English have armed their new cruiser "Lion" with guns of 13·4″. In Germany they have delayed the completion of four battleships with the object of introducing a new gun of a calibre of 14·57″.

A. E. Harrison, Major, late R.A.

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The Siege of Port Arthur—General Artillery Observations.

Translated from "Russian Artillery Journal," August, 1910.

In the siege of Port Arthur we have the only example of an attack on a fortress under modern conditions.

The town lies at the South-East corner of the mountainous peninsular of Kwangtung, which is joined to the mainland by the narrow isthmus of Tsinchu. The coastline is indented by numerous bays and inlets, the most important being Talienwan Bay, which affords good anchorage to merchant vessels and Port Arthur Harbour chiefly used by warships. The town is surrounded on the land side by ranges of hills offering a series of defensive positions.

The coast defences consisted of three groups of forts, namely, The Tiger's tail Golden Hill, and Cross Hill. In these three groups there were twenty-two batteries, only nine of which were provided with concrete platforms and epaulements; all the rest were of a temporary character and mostly in an unfinished state when war broke out. The coast defences extended for nine versts.

The land defences formed a semicircle round the town and harbour, each flank covered by the coast defence batteries. The lines of defence were constructed to face north-east, north, and west, of which at the beginning of the war only those facing north-east were completed. The remainder had only been roughly marked out.

The strong points of the position were:

1. The rocky and broken nature of the ground over which the attack must be made.
2. The well protected flanks.

The weak points were:—

1. The unfinished state of the trenches and gunpits.
2. The close proximity to the town and harbour. (In places the most forward positions were only three versts from the inner basin, where the fleet took refuge).
3. The amount of dead ground along the front.

Work was carried on with feverish haste from the moment hostilities began. Forts were constructed at all points where the conformation of the ground was favourable. The intervals between the forts were occupied by infantry trenches and field gun epaulements, while the whole front was protected by barbed wire entanglements, electrical mines and fougasses.

A second line was prepared for defence by twenty-two batteries and was connected with the front and rear by covered trenches.

In addition to the manual labour of digging trenches and earthworks, large bodies of mechanics were employed in the construction of a net of telephone and telegraph wires connecting every part of the defence, and in the erection of searchlight apparatus on commanding hills.

Notwithstanding that five and a half months were available for the work and that the number of workmen employed daily averaged 6,000 Chinese and 5,000 Russians, the fortifications left much to be desired when the Japanese began their advance. The lack of balloons, tools, and covered approaches was especially felt. Several of the forts suffered from the want of an adequate supply of ammunition.

Armament:—

In July 1904, when the Japanese army approached Port Arthur the total armament of the fortress consisted of 547 guns of all sizes; of these 118 were placed in the coast batteries, 417 in the land defences and 12 in reserve. Out of the 118 guns on the coast front, 82 were of 6″ calibre and upwards. The majority of them were out of date and badly mounted.

Out of the 417 guns on the land front, 121 were of 6″ calibre and upwards. Of these only eight were howitzers—a quite inadequate number when contending with siege artillery.

When the land defences of the fortress were originally planned, the possibility of an attack at close quarters was overlooked, the result being that the guns were mostly placed in exposed positions on the crest line or mounted on the walls of the forts, whence their maximum range could be utilized. Not a single battery was placed behind cover or on the reverse slopes, and the majority of the guns could not be depressed sufficiently to shell an enemy at close quarters. Subsequent events revealed the weakness of these dispositions. Further, three of the most forward forts were armed with heavy guns, which would have been better situated in positions more to the rear, their places being filled by guns of lighter calibre.

The small number of guns held in reserve was not sufficient to cope with the varying stages of a regular siege.

At the commencement of hostilities the ammunition parks contained 42,000 rounds of field gun ammunition; allowing for an expenditure of 12,000 rounds during the preliminary struggle, there remained 30,000 rounds when the regular siege began, i.e., about 400 rounds per gun.

The whole defensive circle by sea and land was divided into twelve sectors, each forming separate commands.

The garrison consisted of about 47,000 men of all arms under the supreme command of Lt.-Gen. Stoessel.

Operations:—

Lt.-Gen. Nogi, commanding the Japanese army of three divisions, attempted to

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carry the fortress by direct attack and failed. Regular siege methods were then adopted and the fortress surrendered on December, 20th 1904. The key to the position was 203 Metre Hill and when this eminence was captured the fate of the fortress was sealed.

Remarks:—

Hostile operations, including those of the fleet, lasted 11 months, of which 4½ months were occupied by the regular siege.

No artillery duel, in the proper sense of the word, ever took place, owing to the inferiority and bad disposition of the fortress guns.

The want of cover was very severely felt. This is clearly seen when the list of casualties among the artillery is examined. Of the guns placed in the open 50% were put out of action, while of the 40 guns which were subsequently placed behind cover only two were destroyed.

The importance of denying possible artillery positions to the enemy was especially realised after the loss of the Wolf Ridge, which then became the main artillery position of the Japanese.

Even if hills are not wanted actually as artillery positions, they are always valuable as observing stations and therefore should be withheld from the enemy as long as possible.

203 Metre Hill affords a good example of this axiom. Previous to the capture of this hill the Japanese could not see the warships in the Harbour and therefore could not damage them. As soon as it was taken however, observing stations were established on it and the ships were sunk one after the other by fire from 11" howitzers.

The fire control of the Japanese artillery was excellent. The fire was concentrated or distributed in accordance with the tactical requirements, each battery having its target allotted to it by the artillery Divisional Commander, who was thereby enabled to keep the expenditure of ammunition under his own control.

The fire discipline of the Russian artillery was undoubtedly the superior, but fire control was chiefly remarkable for its absence.

Batteries were allotted to infantry detachments instead of being kept under the command of a superior officer in close touch with the G.O.C. A great waste of ammunition was the inevitable result.

The Japanese artillery suffered very slight loss owing to the lack of long range guns against them. The Russians were further handicapped by the want of balloons to assist in detecting covered positions.

Port Arthur taught many lessons in the method of using artillery in the firing line.

The following are worthy of special notice:—

1. The absolute necessity of cover for the gun detachments when not in action.
2. All guns must have a wide arc of fire. Several guns were placed in embrasures of forts and being on fixed mountings could only fire in one direction
3. The importance of flank approaches to the point of attack.
4. The necessity of holding guns in reserve to cope with sudden emergencies.
5. For repelling an assault 57 mm. Q.F. guns firing 20-30 rounds a minute were found to be the most useful.

No covered observing stations had been prepared previous to the siege and these had to be constructed later on. The best type was one consisting of a half-cylinder of wrought iron ½" thick and 4—5 feet high covered with a cupola shaped iron roof.

The Japanese made extensive use of mines for blowing up breastworks and fort walls. Counter mines were dug on several occasions by the Russians with great success.

Hand grenades were largely used on both sides. A light mortar was also carried into the firing line by the Japanese for use with a similar, but slightly larger type of projectile.

Searchlights and star shell were extremely useful to the Russians on many occasions, especially during the night attack on November 17th 1904.

J. K. L. Fitzwilliams, Lieut. R.F.A.

Epitomized translation of an article on

The question of Firing against Balloons in Germany.

By Captain Jost de Staël, of the French Artillery.

Translated from "Revue D'Artillerie," September, 1910.

By the appearance of dirigible balloons, a delicate and difficult problem is presented to the artillery arm.

What sort of materiel should be employed?

What description of projectile.

Which are the most efficacious methods of firing?

The Germans began to study these questions as soon as dirigible balloons entered the realm of practical realisation.

As yet there has been no official pronouncement on the subject, but trials continue to be very actively carried on with a view to arriving at a practical result.

The firms of Krupp and Ehrhardt

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have set themselves to work very diligently and have evolved various descriptions of guns, some mounted on motors, some on horsed carriages and others for use on the deck of ships.

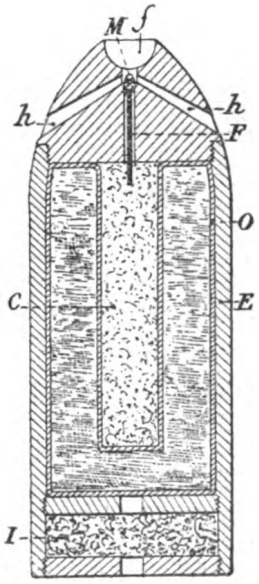

Fig. *e*.

Hartbaum Shell

E. Body.
O. Chamber full of oxygen.
C. Bursting charge.
M. Spongy Platinum quickmatch.
I. Incendiary composition.
F. Fulminate composition.

The first Figure *e*, invented by a M. Hartbaum. (See the section Fig. *e*.).

E is the body of the projectile.

O an inner container filled with liquid oxygen.

C is the burster.

M is a piece of spongy platinum placed in a cavity in the ogival head of the shell communicating with the exterior by means of two canals *h h*.

In passing through the gas of the balloon, the piece of spongy platinum becomes incandescent and sets fire to the fulminating composition *F* which explodes the charge *C*, this in its turn breaks the container which holds the liquid oxygen. This oxygen on meeting the hydrogen gas in the balloon combines with it causing a violent explosion.

Some more incendiary material *I* in the base of the shell completes the explosion of the balloon.

The second pattern of shell brought out by Krupp is shown in Fig. *f*.

It consists of a thicker body *E* filled with a mixture of black powder, saltpetre, magnesium and resin (*I*)..

This mixture is ignited by means of a time fuze, *T* after the shell has left the bore of the gun.

The firm of Krupp has brought out two sorts of projectiles for use against balloons.

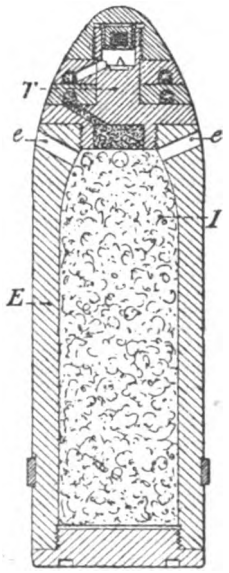

Fig. *f*.

E. Body.
I. Incendiary composition.
T. Time fuze.
e e. Gas escape holes.

The flame together with a dense black smoke escapes through the orifices *e* and the hydrogen in the balloon is exploded.

The point in the shells is that they do not explode on touching the ground, which if they did, they might prove dangerous to friendly troops.

Krupp carried on experiments with a shrapnel shell filled with balls fastened together in pairs by means of pieces of wire.

Some experiments were also made with shrapnel containing 36 zinc balls and furnished with slow burning composition intended to ensure the explosion of the balloon.

The firm of Ehrhardt have also constructed a special shell and a special shrapnel for their 5 c.m. guns (2 inch).

The shrapnel is made of thin steel and weighs about 5 lb. The cartridge weighs 6½lb.; 3-ounces of which being the weight of the charge.

It contains 1¼ ounces of explosive, 128 hard leaden balls, and 27 pieces of hardened lead each weighing about 5 drams.

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When the aluminium double action fuze becomes detached at the moment of explosion, three small brass wings fixed on its base, become free and drawn along by the rotatory motion imparted by the fuze help to enlarge the hole made in the balloon envelope.

The Ehrhardt company have also made a double action fuze for their shrapnel containing a smoke producing composition which becomes ignited at the moment of departure of the shell and leaves a smoky path in the air like the Krupp.

The high explosive Ehrhardt shell made of thin steel weighs nearly 3½lb. It contains an explosive charge weighing 1½ ounces, some smoke composition and some pieces of steel; the brass double action fuze has a special detonator.

The American shell Bonner Semple is constructed so that if fired by day it is filled with lamp black either alone or mixed with oil or water.

If it is intended to be fired at night, a fuze composition is put into it such that as soon as it comes into contact with the air it breaks spontaneously into flame. The composition used being a solution of phosphorous in sulphuret of carbon or else a preparation of zinc.

Experiments and methods of fire:—

Exact particulars are unobtainable of the experiments that have been made in Germany of firing against balloons. Although we know from the newspapers that firing has been carried out against both free and captive balloons.

It being impossible to fire in peace time against dirigibles driven by their own engines.

In February, 1908, firing was carried on with a 65 mm. Krupp and special shell against two small captive balloons of three metres diameter on the practice ground at Meppen at 1,600 metres range.

There was blowing at the time a violent wind which made the balloons oscillate tremendously so that laying was difficult.

One balloon was struck at the fifth round and the other at the eleventh. Both fell immediately they were struck and despite the bad weather the trajectories of the shell were plainly visible from a point of observation to one side of the gun.

In 1908 and 1909, many other experiments were carried out but with what result is not publicly known except that it was found that the guns mounted on service carriages were useless for this sort of fire.

Although no precise instructions have been given for the conduct of fire against balloons certain articles have appeared in the German periodicals which indicate the ideas of certain well known military critics on this subject.

The German Field Artillery Manual directs that if possible the distance should be determined by setting off on the map, observations made by two observers. If there is no time for this, fire should be opened with percussion shell at the longest possible distance; and to ensure getting the balloon within an effective zone, every endeavour being made to obtain a 100 m. bracket. When the balloon is bracketed, the range is reduced 50 m. and a salvo fired.

German Opinions:—

Some authors say that it is impossible or at least most difficult to range against a dirigible balloon which constantly changes its position in three different planes. The distance must be obtained somehow as exactly as possible.

The means of obtaining the range being a matter for opticians and mechanicians.

The gunner can then attempt the destruction of the balloon by rapid fire at different angles of elevation.

A very large quantity of ammunition will be consumed but that appears unavoidable.

Shrapnel will not answer; as fire with shrapnel is too slow and the bullets would be dangerous to our own troops.

A small calibre gun with an incendiary projectile will have to be used. The gun must be capable of being fired at very high angles of elevation and very rapidly.

In any case there is no doubt that the dirigible balloon forms a most difficult objective to artillery.

One writer recommends the employment of balloonettes, filled with explosive material and time fuzes, to be let loose against the balloon.

But how is it possible that these could by any chance in the world ever touch the dirigible balloon.

A. H. C. Phillpotts, Col. R.A. (retired).

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Ideas and facts of the day.

Translated from "Le Spectateur Militaire," of October, 1910.

Preparation for war includes not only instruction in subjects of which mobilization and concentration are among the most important, but also an intimate knowledge of the military organization of other Powers.

For instance while it is very useful for infantry to learn the tactics of a friendly artillery, it is incumbent on all to study the methods of a possibly hostile one, and also the procedure of the other arms.

Our Eastern neighbours, watchful of the events in Manchuria, have found it necessary, after the experience of the battles in the Far-East to remodel the whole of their regulations, which dated from the period 1888 to 1895. This work of revision, begun in 1906, has just been completed. The new regulations bear the following dates:—

Infantry Regulations, May, 1906.
Artillery Regulations, June, 1907.
Field Service Regulations, March, 1908.
Foot Artillery Regulations, November, 1908.
Cavalry Regulations, April, 1909.
Firing Regulations, October, 1909.

From the study of the above one may learn the general and special principles of German tactics. Our officers will thus be able to form an exact idea of our neighbours' warlike procedure, and forewarned, will complete their study of the ways and traditions of our possible enemy.

Speaking generally, while strategical and tactical principles are immutable for all armies, the executive procedure and details vary according to the morale and temperament of the troops concerned. Strategy and tactics are also influenced by the armament employed.

Influenced by these considerations, Commandant Pardieu (*pse.*), has had the very happy notion of making a profound and critical study of the most recent German regulations and of publishing the results arrived at for the benefit of his comrades. He very cleverly extracts the spirit and the gist of the regulations in question and gives a logic appreciation of their value, taking into account the German character and temperament. He points out in what respects our regulations differ from the German.

Not content with this synthetical work he has taken up the task of an impartial critic and has sifted the regulations and the tactical ideas of our Eastern neighbours. Among the most recent military works, there is none perhaps more useful or necessary, and the author deserves high praise for his initiative and his work.

Commandant Pardieu, first collects the details relating to the three arms.

As regards infantry the extended formation necessitated by the effect of fire does not commend itself to the German soldier who is heavier and less adaptable than ours. The regulations also have tried to retain a certain grouping of men under a leader. They have formed what is called a "group" consisting of four files. This little group must keep its cohesion as long as possible, it has a responsible leader.

The Germans are much afraid of the mixing up of units and try to avoid it in every way possible. They also always recommend fighting with units with great depth. For long they believed in the almighty power of fire; nowadays they admit the likelihood of bayonet fighting, of which the war in Manchuria has shown the necessity and the importance. The losses experienced in this campaign, on the side of cold steel, were as a matter of fact 8%, i.e., almost equal to those from artillery fire. These figures have an eloquence which it is impossible to deny.

The German regulations inexorably subordinate the use of ground to the maintenance of direction; in other words a unit cannot, on any pretence, leave the zone which has been appointed to it. They recommend, apparently with reason, much moderation in the use of entrenching tools when on the offensive.

The question of the concealment of artillery has been much discussed in Germany. The present regulations do not recommend complete concealment in the attack and formally forbid it for "infantry" batteries. On the defensive, they allow concealment for counter-batteries but not for "infantry batteries" General Rohne, declares that "in principle the positions must be so chosen that at least one piece may be able to lay "direct." According to him the shield is an all-sufficient protection, and one must never forget, as he justly remarks, that "efficiency counts before protection." The Germans recommend therefore in most cases the half-hidden position, which is a little more than the concealment of the material.

General Rohne, also admits, that "it will still be some years before our artillery learns how to obtain the best results from its perfect material."

The regulations insist on the importance of communication and recommend the most frequent employment possible of the telephone and signalling.

Our neighbours, perhaps wrongly, build great hopes on the employment of light and heavy howitzers.

The German cavalry was formerly organized in divisions only: one now foresees their formation in corps. The regulations prescribe no regular formation

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for the division; one only mentions it as an end to be attained. The use of echelons becomes more and more general. We can foresee what is called the "verschleierung," i.e., the curtain which should conceal a movement, a rendezvous, or a position; this curtain may be used in the offensive or the defensive. The new regulations give great importance to fighting on foot; the German cavalry must according to present ideas, change itself into mounted infantry. With this object the Germans have given their cavalry a carbine carrying 2,200 yards, using the infantry cartridge and provided with a bayonet. They enjoin on their cavalry desperate dismounted fighting, and do not give enough weight to these words of general von Kleist "Think once before attacking on horseback, and three times before attacking with the carbine." Can one hope, with short-service, to make a soldier into a cavalry-infantryman? It is almost impossible.

In fighting orders, one is struck by a certain number of points on which the regulations specially insist.

These points mark the exact characteristics of the spirit in which the regulations are framed.

They are as follows:—

The offensive spirit.

The development of initiative.

The necessity of co-operation.

Attack by masses.

The offensive spirit is mentioned on all the pages. The Germans more than ever wish to impress it deeply on all the members of the army, both in the leaders' brains and in the soldiers' temperament.

The infantry regulations contain these words:—

"Infantry must cultivate its natural taste for the offensive. All its actions must be governed by this one thought 'Forward? On the enemy, cost what it may'!" "

This rôle demands from troops high moral courage.

The artillery regulations declare that "the first quality of the leader must be the love of responsibility," and those of the infantry add that "inaction and negligence are graver faults than a mistake in the choice of means." Field Service is permeated by this axiom: "The battle is not carried on by exact rules."

The necessity of communications is frequently mentioned as much between the different channels of the hierarchy as between the different arms.

Our neighbours evidently have a predilection for attack in masses. The Germans do not admit, in general, that one accepts battle before all one's preparations are complete. Troops having an offensive mission and encountering the enemy must first concentrate and then advance to the attack with all its forces in mass. Everywhere, in the regulations of the three arms, one finds this idea of the powerful attack, fiercely launched with all available forces.

One of the most interesting questions is that of the advanced guard. The Germans have a different idea of [illegible] to the French. According to their notions, its only mission is to protect the mainbody against surprise, and by its resistance if attacked, to allow it to deploy. It is a "shield" and not an arm.

The advanced guard must only engage in an offensive action when success is certain. One even foresees the case when "it will be prudent to withdraw it in order to avoid a bloody fight and to hasten the arrivel of the troops of the main body."

The Germans only recognise one form of offensive action; they do not, like the French, differentiate between the "wearing down" fight and the decisive attack. Every offensive battle is conducted like a decisive action. Their artillery forms line "in bulk," its intervention depends on the brutal action of a mass.

General Percin, on the contrary, considers that in the offensive, the "infantry" battery plays the principal part; the counter-batteries are only there to relieve it. At the Grand Manœuvres of 1909, the French eye-witnesses were particularly struck with the rashness of the German batteries; the "infantry" batteries showing themselves in the open, the others fighting under the most favourable conditions partially concealed. This situation seems very dangerous in presence of a well-hidden, vigilant and active artillery, all of which virtues are possessed by the French.

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Some considerations on the fortification of the battlefield.

Translated from "Revue de L'Armée Belge," September-October, 1910.

THIS article is an appreciation of the 4th edition of an essay by Colonel de Mondésir, a French engineer officer, on the tactical employment of Field Fortifications.

The essay is divided into three parts, viz., (1) Temporary Field-works; (2) Semi-permanent works; (3) Application to the concrete case of the organisation of a modern battlefield. Its principles are based on the writings of Colonels Ruffey and Marchand, of the French army: a paper by the latter entitled, "The Fire of Artillery over Infantry in Preparation for the Assault," being published at the end of the essay.

Colonel Marchand's arguments are deduced from the consideration of the ballistics of the new French field gun, whence he concludes:—

(1). That when the attacking infantry arrives within 300 metres of the enemy's position, the supporting artillery must first lower the height of burst of their shrapnel, and then go to percussion until the infantry get in to 150 metres.

(2). The range should then be increased, first by 200 metres, then by a further amount, and firing stopped after a short burst of rapid fire.

These considerations apply to ground sloping up to the enemy's position or horizontal; if the ground slopes downward, the space intervening between the opposing forces cannot be seen sufficiently clearly to enable the attacking artillery to fire over the heads of their own troops.

Colonel de Mondésir concludes from this that the field of fire in front of the defenders, at the moment when the cessation of the enemy's artillery fire enables them to man their parapets and turn all their fire on the attack, will be no greater on slopes facing the attack than what can be obtained if the defenders are intrenched on the reverse slopes, out of sight of the hostile artillery; short fields of fire are therefore permissible.

Field fortification is a weapon of defence always at the disposal of the soldier. The necessity of shelter or of defilade results from the paralyzing power of the modern Q.F. field gun, whose "rafales" make it impossible even to leave supports without cover. To put the attacking artillery at fault is therefore the first duty of those whose business it is to arrange cover for the firing line and shelter for the counter-attacking force.

This leads to the following conclusions:—

(1). A crest line under fire from superior hostile artillery can now only be occupied by small groups of entrenched outposts, whose supports will be sheltered in prolongation rather than

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in rear of the entrenchments, owing to the difficulty of advance or retreat in any numbers, over slopes under fire from the attack.

(2). Oblique fire must if possible cover the slopes over which the attackers must pass, owing to the reduction in the strength of the firing line on the crest.

(3). To protect the superior crest from the direct observation and silencing fire of the attack, it should be placed on a secondary ridge, on the edge of a plateau, or even on the reverse slope; provided that it has a field of fire of 250 metres, and can cover the crest on which the attackers will arrive, and where they can be held by the artillery of the defence, while their own cannot support them, until the reserve can develop a counter-attack. The supports for the firing line being entrenched in prolongation, or slightly to the rear on a flank, share its comparative immunity when the hostile artillery increases its range.

(4). The lines of defence must be écheloned from front to rear.

(5). A portion of the artillery must be placed in rear, covering the crest on which the enemy's advance is directed, out of range of their artillery, and able to come into action in support of the counter-attack.

Less precautions are necessary when the enemy's artillery is not superior to that of the defence.

The adoption of these tactical considerations to the principles of field fortifications is afterwards dealt with. The author concludes that all kinds of closed works must be done away with on the battlefield; only lineal targets must be presented to the enemy; they will be short and well distributed, the shelters being in prolongation of the trenches.

It is desirable to have only one type of entrenchment, which can be improved on as required under shelter of the cover first thrown up.

A. H. Webb, Capt. R.G.A.

Dutch Coast Defence.

Translated from "Militar Wochenblatt," No. 6, 1911.

The question of Dutch coast defences and especially of the fortification of Ebething, are being at the present time energetically discussed in the English and German press. It must therefore be of great interest to become acquainted with the standpoint of the Dutch government in a matter of such great importance to the country. In December, 1910, the Naval and War Ministers addressed a joint note to the 2nd Legislative chamber from which the following extracts have been taken:—

It is of the greatest importance that the defence system of Holland, should ensure her power of maintaining absolute neutrality in any war between the great powers.

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The country must not only be able to repel any infringement of her land or sea frontiers but also be able to safeguard Dutch territorial waters from being the scene of any action which might be held by international jurists to be an infringement of neutrality.

The stronger and better prepared Holland is to repel any form of attack, the more certainly will her system of defence compel respect for her neutrality.

An attempt on the part of a belligerent to pass a portion of her forces across Holland must above all things be prevented. The danger of a belligerent taking such action from the sea, calls for a powerful defence of all the sea approaches to Holland.

The memorandum goes on to indicate the harbours and channels which might be used as jumping off places (Ausgangspunkt) for a sudden attack.

Attention was called to the special importance of the West Scheld for this object—leading as it does to the roadstead and harbour of Flushing, and to the upper reaches of the Scheld—the largest battleships can find a safe anchorage in Flushing Roads, Flushing also possesses a good harbour and ample quay accommodation so that the possession of this harbour would be of great importance to a fleet operating on the Dutch coasts.

The government also remarked that the Helder, Flushing, and Rotterdam, offered a favourable base for a hostile fleet, and that the Hook of Holland offers good landing facilities.

The means laid down as necessary to the successful defence of her coast are:—

(1). The Army.

(2). The Fleet.

(3). Coast defences.

The composition of the fleet should consist of armoured ships, gunboats, torpedo-boats, and submarines. The following new ships are required:—8 sea going torpedo-boats, 14 armoured gunboats, 2 submarines, and 2 escort ships for them. The gunboats should be of 550 tons displacement, should have an armoured belt 55 mm. thick, and an armoured deck of 20 mm. and should be provided with internal combustion engines.

Armament: four 10·5 cm. semi-automatic 50-prs., and two machine guns—the rôle of action of these gunboats would be to cover the movements of the torpedo-boats leaving or entering the channels—the carrying out of patrol and safety duties in navigable waters, the prevention of mine laying, preventing light hostile craft from breaking through, support of the army when the latter is opposing the crossing of a river, guarding and defence of blocking forts (Sperreu), which are outside the range of coast forts.

The coast defence armament should consist of heavy and medium calibre guns of 45 calibres length, of light Q.F., and of machine guns. The heavier guns should be mounted behind shields, or, if liable to be attacked from all sides should be placed in armoured turrets.

Existing coast defences should be strengthened to meet modern conditions. The works on the level should be re-armed.

A second fort should be built at Yumiden, and armed with guns

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in armoured turrets. Forts Kij, Kduin, and Erfprinz, should be similarly armed. An armoured fort should be added to the fortress of Heloot Slugs.

The government consider the protection of the harbour of Flushing to be of the utmost importance—as the fleet alone would not be sufficient to defend it—for this reason a very strong armoured fort near Flushing is absolutely necessary. These requirments will involve an outlay of 25,000,000 Gulden for coast defence, and of 13,000,000 for the fleet.

R. M. B. F. Kelly, Col. R.A.

The English Army.

Translated from "Le Spectateur Militaire," December 15th, 1910.

CONCLUSIONS.

This general review of English tactics shows that our neighbours have adopted the principles exemplified by modern warfare. If the English regulations seem timid and hesitating on certain points, we must not forget that they provide for uncivilized and not European warfare.

The enemy with whom they will have to fight, will be less active, less daring, and provided with inferior artillery material. If one also takes into account the moral effect on natives of a European army's retreat, one can understand why the English are so careful in their offensive tactics. However, whilst one may commend their prudence, one must regret that they do not make better use of their excellent cavalry to obtain more complete information. We have seen that the English do not favour the advanced guard action, with the view of informing the main body of the enemy's dispositions. As the greater part of the mounted troops operate almost independently, several days' marches to the front, one may believe that the Commander-in-Chief will not obtain from them all the assistance he might expect. He will have great difficulty in obtaining information before the action, and the plan of attack on which his movements depend, may suffer in consequence.

We have remarked on the inadequacy of the échelon system; the manœuvring troops either do not exist, or are indistinguishable from the reinforcing units. If the attack fails at one point, the general reserve must be at once called for; this, in its too distant position, may not come up in time.

The regulations seem convinced that the enemy will not be expecting the general reserve, and that the occupation of the ground will be enough to crown the attackers victory. In this case it is useless to increase the artillery range at the moment of assault; it must on the contrary stop its fire (or change the position of the battery) and resume it when the enemy retires.

If the enemy has a general reserve in hand, the assaulting column, not expecting it, will find itself in a bad case owing to the disorder

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and confusion in which it reaches the position. Speaking generally, it would be better to expect that the engagement of the reserves will be the defender's last resource. Until the latter are put "hors de combat," the victory is not assured, nor can it be called decisive.

On the other hand the action of the artillery is quite understood and suited to uncivilized warfare. The enemy will undoubtedly not bring into action a large number of guns, and the principle of the inviolability of the front so dear to Lord Roberts, can never be considered a hard and fast rule.

If the passive defence is adopted, the front, too weak to resist a violent attack, will be invariably broken if the enemy has any courage. As regards the use of cold steel, the English regulations do not attach much importance to the bayonet. We said that its effect was above all moral, but it is of first importance when the preparatory fight has been well conducted and the enemy's morale shaken. The German and French regulations agree in saying that "the assault by cold steel definitely confirms defeat. "

To sum up the South African war, on which the English regulations are based, has unmistakeably established the necessity of obtaining superiority of fire and utilising cover.

It has shown in a specially striking manner the immence advantage to a nation of profound patriotism and a well-founded ideal of duty. Thanks to their high moral courage, the Boers were able to resist for a very long time troops far superior to them in all particulars, and once more showed the accuracy of the old saying, "Courage is the best Sword." Different nations now insist on the supreme duty of developing the soldier's moral strength, and our regulations express this necessity better than the others in these words: "Moral force constitutes the most powerful factor of success, it animates the employment of material means."

We have studied the organisation of the different units of the English Army, we have also seen how they are handled in action. It is perhaps not without interest, in conclusion, to return to the important question of recruiting, and to prophecy, on the basis of recent events, a radical re-organisation of our neighbours army.

Since 1901, England has decided to emerge from her ivory tower; she has renounced her splendid isolation of nearly a century, and has thrown the weight of her power into the European balance. In taking this resolution, the English Cabinet expressly decided on the re-organisation of the army. Their necessity for the future was not a national guard, only sufficient for an uncivilised campaign, but an army worthy of the name, similar to European armies and capable of affording adequate assistance to a friendly power.

No doubt a fleet three times greater than the next largest in the world is a factor in an alliance which cannot be left out of account. But it cannot be contested that naval wars have never settled a dispute. Trafalgar in itself was a barren victory, and one would search history in vain for a sea battle with as important results as Jena, Waterloo or Sedan. The English understand this perfectly when they say that the frontier of their Empire is found on the banks of the Meuse.

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England in consequence had to resolve to re-organise her army on the lines we have just examined. But this effort was not sufficient. We have seen that entire districts remain closed to recruiting. The annual contingent might be more than doubled if the mode of recruiting were changed. The English military organisation is faulty from the root, and its becomes more and more obvious that England will never have a European army if she retains her obsolete recruiting system.

An ardent campaign, conducted recently by Lord Roberts, and the National Service League, permitted one to hope for the adoption of compulsory service. The aged Field Marshal, in a notable speech in Parliament, pointed out the danger and described the present army as a "pure sham." A clever propaganda, published by the League, prepared men's minds for the idea. This was to enrol all able-bodied men of 18 to 30 on a system similar to that in vogue in Switzerland and Norway; they must serve four to six months the first year, and fifteen days in each year following. One would thus have 150,000 recruits each year, and on mobilisation could put in the field a million soldiers. Unfortunately the House of Lords, although convinced of the advantages of compulsory service, feared the loss of their popularity among the working classes, and on July 13th, 1909, they rejected the project on the plea of the excessive expenditure it would entail. Now according to the League's calculations this expenditure would not exceed £4,000,000. If one adds to this the needful additions to barracks, the extra cost of mobilization, etc., one may estimate the total at 8,000,000. This figure which sounds formidable is but little for rich England who spend on defence an annual sum of more than 60 millions.

The National League however, despite its first failure, does not own itself beaten. Every day its followers increase, and it has decided to undertake a wider campaign to make itself heard in Parliament.

It will thus have the means of influencing votes and perhaps obtaining a majority. We may hope and expect speaking as allies, that its effort will be crowned with success and that soon, thanks to the sacrifices sanctioned by Parliament, the new English Army will invest the "Entente Cordiale" with new vigour and authority and will thus go far to assure the peace of the world.

Edward P. Smith, Major R.F.A.

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Ideas and facts of the day.

Translated from "Le Spectateur Militaire," of November 1st, 1910.

Continued from page 189 of Translations for February, 1910.

We have seen that the characteristics of the German battle regulations are:—
The offensive spirit.
The development of initiative.
The necessity of communications.
The attack by masses.

Our Western neighbours only recognize one kind of offensive battle, they do not, like us, distinguish between the "wearing down" fight and the decisive attack. The regulations do not mention the former, and every offensive battle is conducted like a decisive action.

In Germany the extent of the front is not laid down; the frontage depends on the strength and intentions of the troops, and the development of the enemy's front. As a matter of fact, the lessons of the Russo-Japanese War show that in future battles; the frontage will exceed what was thought reasonable only a short time before. At the 1909 manœuvres, one saw a "Red" German Division on the defensive occupying a front of 10¼ miles.

The next day the three Red Army Corps in compliance with operation orders, had to engage on a front forming a concave line of 16 miles frontage. On the 17th, two "Blue" Army Corps in position behind the Tauber, had to defend a frontage of 10¼ miles, and there were only three divisions in the front line. The German regulations like our's, recommend marching on the enemy as long as possible without opening fire. They try to otain from the beginning superiority of fire, by means of a dense chain. The arrival of reinforcements is not as in France the signal for a dash forward, but for the renewal of an intense fire, in which the latest arrivals take part. The Germans hope to preserve fire discipline as long as possible, and thus obtain superiority over a more numerous, less disciplined, and less strongly posted enemy.

Before the Russo-Japanese War it was held in Germany that fire would suffice to overcome the enemy's resistance; the assault was only to be in some way the consecration of the victory already gained. That is a false reading of the teachings of military history; St. Privat and Plevna among others offer in this respect noteworthy instances. Never, hardly ever, has steady infantry been dislodged from a "point d'appui" by fire alone. The events in Manchuria have gone far to confirm this fact; if fire is the necessary preparation, the attack can only succeed by hand-to-hand fighting.

The bayonet has shown its preponderating importance, with it is the last word, which is not displeasing to us.

The German regulations allot certain batteries to accompany the attack, which is not an easy undertaking. How in fact can one imagine that batteries in the open or only partly hidden like German batteries, can at the most decisive moment, bring up their limbers, expose their teams, and follow their infantry? The Prussian General Rohne does not under-rate the difficulties, and foresees that in certain cases the rush forward can only result in the complete destruction of the battery.

Commandant Meunier, in his work on the war in Manchuria, remarks that neither on the Russian or the Japanese side was there any Artillery accompanying the attack. However, it is undeniable that accompanying batteries are very useful to constantly support the Infantry, and to arrive at the same time with them on the conquered position. It is a question of manœuvre and utilisation of covered approaches by the Artillery leaders.

The German regulations say that on the signal for assault "the troops behind the chain at once assemble and throw themselves forward by the shortest road, regardless of losses."

What is meant by the word "assemble"? If one means in small columns, it is a wise and reasonable order; if on the other hand it denotes concentration in mass by battalions or even companies, one will see a renewal of a hecatomb like the guard of St. Privat.

All the German regulations specially insist on the pursuit being pressed to the utmost. "The victory is only completed" say the Infantry regulations "by the pursuit, with the object of the annihilation of the enemy." In 1870, the Germans never pursued; in Manchuria, the Japanese never would or could follow up their successes.

German ideas on general tactics differ somewhat from French. The general plan of the German battle may, according to Commandant Pardieu, be thus described:—

"On meeting the enemy, attack him if you are the stronger, but attack at once without delay; do not let him reconnoitre or prepare his defence. If you are not for the time the stronger, fight a delaying action, wait till all your forces are assembled; then, when the moment has come, attack suddenly with all your troops. Make your principal effort on the enemy's wing, which you must outflank, turn, and overthrow by an irresistible concentrated attack."

Properly speaking there is no general reserve in the German Army. The troops are divided in two parts, one to make a holding attack on the enemy's front, the other on the flank; in the offensive to deal a decisive enveloping blow, on the defence to ward off turning movements.

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Behind the front line, a partial reserve in thin formation, their sole object being to assist the fire of the front line and hold the enemy, while on one flank the decisive movement is in progress. At the last grand manœuvres one agreed that commanders kept some troops one-eighth to one-tenth of the force, under their hand in order to fill up gaps, to link together the front and flank attacks and not for any other manœuvring purpose.

According to Major Kuhl, that is not an abdication of the chief command. "His action, rather more delicate than formerly, will be taken at another moment, in the preparation of the battle." The general principle of German manœuvre is while holding the enemy in front, to turn and overpower his flank. This very simple manœuvre was constantly successful with our opponents in 1870, and was made brilliant use of by the Japanese. One must say that the Russians were as inactive as the French in 1870, a condition which is indispensable to the success of turning movements.

In strategy the Germans still prefer the system of enveloping a flank. What they admire most is Moltke's conception for Sadowa, in other terms the highest art would consist in marching on the enemy with one army, while another, to be concentrated at will for battle, will fall on his flank. This repetition of Sadowa, Moltke wished to effect in 1870 on the French frontier; the 3rd Army was detailed to attack our left flank. One knows how Forbach's unlucky move defeated Moltke's intentions.

At the present day all or nearly all German writers, von der Goltz, Scherff, Grippenkerl, and many more prescribe the same method of fighting. The Germans do not think it possible to pierce the front of a line of battle, or to gain victory by the breaking up of the enemy's lines. According to them all troops advancing in wedge-shape would be at once crushed by converging fire, and driven back by the attack on their flank of the hostile reserves. That is called the doctrine of the "inviolability of the front," never admitted in France, and certainly with reason.

To hold the enemy everywhere says Major Kuhl, and seek for success from massed reserves, under the orders of the commander-in-chief, in a zone of his choice, such methods have become impracticable. In these terms he condemns the Napoleonic method and French tactics. He insists that the reserves will never have time to gain the selected point, but he forgets that battles will last more than one day, as in Manchuria, and at Leipzig, Mans, and the Lisaine. His mistake also is to assume that the decisive attack will be delivered against fresh troops at concert pitch. Major Kuhl forgets also, or will not admit that troops thinly scattered along the front may be overthrown by an energetic counter-attack. How many times in Manchuria, might not the Russians have pierced the Japanese front! Unluckily they were fixed in their positions and every liberty may be taken against such an enemy. The flank attack has no doubt certain advantages, but its great drawback is that it can nearly always be foreseen. A central attack on the other hand, cannot be seen beforehand, or at any rate only a few moments before its delivery, often too late to prepare to meet it. Is the flank attack certain of finding the enemy's flank? By no means! Remember St. Privat! If one has made a mistake, there is the danger of marching to disaster.

The German battle has a definite plan, and Major Kuhl, is right when he concludes "If the blow is not successful straight away, it has failed." On the defence the Germans condemn in principle advanced lines. It is true that they are risky, but it is not so with very mobile detachments under cover posted in front or on a flank.

The German regulations mention only incidentally the counter-attack, that essential means of defence, they are almost mute on the offensive-defensive.

Commandant Pardieu finishes his interesting article by a "strategic appreciation" of several pages. The Germans favour concentrations in squares. Thence will issue the attack, like a thunder-cloud, to use General von Bernhardi's expression, straining to reach the battle frontier at the first possible moment. All troops are to be so engaged, on a pre-conceived plan carried out with such relentless energy, that the enemy despite all his precautions must unreservedly submit to our fighting initiative.

To the enveloping attack by which we are threatened, we must oppose a formation in échelon, and reply by thrusting straight in front, in order to pierce, by all the means in our power, the thin battle curtain in our front. This curtain once pierced, we shall find ourselves, with all our forces united, on the flank of the enveloping columns, who will be in their turn outflanked.

Edward P. Smith, Major, R.F.A.

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"Militar Wochenblatt."

No. 135, 1910.

Limits to the effect of Field Artillery.

The writer argues that the improvements in field artillery have themselves set a limit to its efficiency. The improvement in indirect fire appliances will tend more and more to restrict artillery and covered positions; improvements in shields will render them more and more invulnerable to artillery attack, and the logical result will be two hostile artilleries facing each other but unable to inflict any damage on each other and unable to give much active support to their own infantry. The author discusses how this impasse will be overcome; not he thinks by a return to direct fire and open positions, but by the adoption of a different gun or projectile.

The author discusses and rejects the pom pom as a substitute for the field gun but advocates a high explosive shrapnel, which he describes as a combination shell. When burst by time fuze, the shrapnel portion of the shell acts as time shrapnel and the H.E. portion acts on percussion as an H.E. shell, and this incresases the moral and physical effect of the shrapnel. With percussion fuze the projectile detonates with great effect both on personnel and material.

January, 1911.

Extracts from the new training manual French Field Artillery.

The chief points touched upon in the extracts are:—

1. Organisation.

Peace 30 4-gun batteries per Corps d'Armée brought up in war to 36. These 6 reserve batteries go to practice every year.

Distribution of fire:—

The new regulations provide for sweeping over a greater width than before. The old regulations provided for a sweep of 8% of the range. The old regulations restricted sweeping to 3 rounds; the new leaves the number of rounds to the discretion of the B.C.; also the successive rounds are fired with a greater amount of deflection. For ordinary sweeping the regulations prescribe 3 turns of the wheel between rounds equivalent to 7½ metres at a range of 1,500 metres. The new regulations introduce double sweeping "fanchez double" wnen 6 turns=1% of range would be given.

The bracket system is even rougher than before; a bracket of 400 metres is sufficient in ordinary cases, except at concealed targets when the crest or covering mass should be located within a 200 or 100 metre bracket.

Ranging examples:—

Examples of ranging have disappeared from the manual with the sole exception of ranging on balloons and aircraft. All aircraft are to be attacked with shrapnel. The system of ranging is as follows:

The two sections (4-gun battery) fire at ranges differing by from 2,000 to 3,000 metres, and fire a ladder; the section commencing with the shorter range increasing, the other decreasing 200 metres each round. Rapid fire without waiting for observation is the rule, and is carried out until the target clears off.

Effect:—

The following being the result of a large number of series each of 32 rounds against a target 100 metres wide, is laid down as the probable percentage of enemy struck:

Range Metres.	Infantry.				Artillery Shielded Guns.	Detachments. Frontal Fire.
	1	2	3	4	5	6
2000	46%	19	15	6	20	20
2500	42%	17	13	8	18	15
3000	33%	16	8	11	15	11
3500	24%	14	6	12	12	9
4000	21%	13	—	—	11	8

1. Single rank standing.
2. Single rank lying without knapsacks.
3. Single rank lying with Knapsacks on back.
4. Single rank lying with knapsacks in front of the head.
5. Working numbers.
6. Numbers under cover.

Telephone equipment:—

A telephone installation carried by 3 mounted men with 500 metres of cable.

Positions:—

Covered positions are the rule. If a battery has to occupy an exposed position, it must always do so under cover of the fire of batteries in covered positions.

Bringing guns into action:—

No more batteries should be brought into action than are required to accomplish the tactical object. It is better to keep batteries in a position of readiness

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than to bring them into action without a definite object. Of the batteries in a position of observation, only so many should open fire as the nature and extent of the target demands.

No. 154, 1910.

The attack of air craft.

In a recent number of the "Tag" a well known aeronaut discussed the means of defence against air-craft and summed up his arguments in the opinion that air-craft can only be met and fought by air-craft. A reply appears in the form of a pamphlet combating this view on the grounds that air-ships were so few, so difficult to replace, and so invaluable for reconnaissance, that no country could use them for fighting their own kind and that protection against airships must be left to earth troops.

The present article criticizes this dictum and the writer shows the futility of attempting to screen an army from airship reconnaissance by artillery fire alone on the following grounds:—

(1). The ease with which airships could keep out of sight and out of range till just over where they wish to reconnoitre.

(2). Owing to danger to one's own troops from indiscriminate artillery fire, either the guns must fire outwards from the centre of a column or camp in which case their action would probably be too late or

(3). The encircling screen of guns must be placed at a safe distance round the line of march or camp which involves an impossible number of guns.

(4). That even if it were possible to provide the guns required they would make such a demand on local accommodation that the movements of the army would be hampered.

(5). That it would be an almost impossible task to distinguish between friendly and hostile airships.

The critic concludes his article by formulating the requirements of a modern army to meet the new conditions of affairs.

(1). A large number of weight carrying aeroplanes to protect one's own airships and fight hostile air-craft wherever met.

(2). One or more guns in every artillery Brigade Division (Abteilung) or Regiment (6 batteries) capable of firing at high angles.

(3). A few automobile guns to work with the cavalry divisions or advanced guards and some special guns for protection of Head-quarters Staff, bivouacs, columns on the march, &c.

(4). That the infantry should be specially trained in firing at rapidly moving aeroplanes.

(5). That machine gun groups should include some machine guns capable of firing at high angles of elevation.

No. 162, 1910.

The Aeroplane in future wars.

The comprehensive experiments of the French military authorities in air-craft during the recent military manœuvres has brought the question of the use or and defence against, air-craft to the forefront.

There are two distinct schools of thought as to the best means of combating these weapons.

One advocates meeting them by gun fire from earth; the other school advocates fighting them by their own kind.

According to this latter school, the fight against airships will much resemble the struggle for mastership of the sea.

In their opinion it will be as futile to oppose air-craft by earth guns as to seek to defend a country against naval supremacy by coast defence guns alone.

The adherents of this latter school are by far the most numerous, they hold that guns can only hope to attack airships with any hope of success that they would be powerless against aeroplanes. which they consider have by far the greater military rôle before them.

Of great interest on this subject is a recent article by a French writer who forecasts a comparison between air-craft and cavalry as scouts in a future war.

In spite of the predilection of his country for this new aid to reconnaissance he does not think that air-craft are at all likely to oust cavalry as a means of reconnaissance.

He admits that in many cases it will be possible to bring in news quicker and from greater distances by air-craft than by cavalry, but that this advantage disappears the moment the weather becomes unfavourable, whereas horse and rider can always protect themselves against weather, the aeronaut is powerless unless he has some suitable place in which to descend and take shelter.

For ascending as well as descending a favourable terrain is necessary to the aeronaut: the horseman can normally rely on his steed while the air-craft is not yet a reliable mode of conveyance.

The cavalry patrol can be more easily concealed, while the air-craft announces its approach to eyes and ears.

Observation from air-craft especially if moving fast is very difficult.

A cavalry patrol can often lie in wait and concealed, and watch and make off as soon as danger threatens. An aeroplane at rest on earth is about as helpless as a turtle on its back.

The writer sums up as follows:—

In spite of undoubted progress in aviation it would be a great error to trust to it alone for reconnaissance. Properly used at the right time and place aircraft will doubtless render the greatest assistance to an army leader—but for all that it will only be a very useful adjunct to cavalry and it would be in the nature of a fatal mistake to ascribe to it a more important rôle at the expense of the mounted arm.

R. M. B. F. Kelly, Colonel.

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The Aeroplane in conjunction with the other arms.

Translated from "Revue D'Artillerie," November, 1910.

We do not by any means suggest that the aeroplane constitutes a new fighting arm of the service, for actual fighting purposes.

It is very doubtful whether, even in the distant future, flying machines will ever be able to transport battalions of troops or heavy machines of destruction.

Let us therefore consider the aeroplane not such as it is at present, capricious in its behaviour and not without danger but as it will be in the immmediate future, safe and under control, and let us see how this useful accessory in warfare can be employed.

Employment of the aeroplane with a Field Army:—

With daily accounts of aeroplane disasters, it is difficult to say what an aeroplane can do, but the aviation week at Betheny, has shown that an aeroplane carrying an aviator and an observer, can easily remain in the air two or three hours traversing 100 or 150 kilometers, not rising more than 500 to 600 metres in the air, which, consequent on the rapidity of its flight is quite sufficiently high to be invulnerable to musketry.

For military purposes it is necessary except under very exceptional circumstances and with a very exceptional aviator, that there should be an observer in the aeroplane.

For surveying purposes a dirigible balloon will probably be more convenient if a storm has not blown it to pieces. But the aeroplane can be best employed in a certain defined direction to observe the situation and to collect information of the greatest interest.

It can in fact act as a sort of aerial cavalry nearly invulnerable and capable of piercing the thickest screen. From it there is no hiding, the observer in a aeroplane can easily reconnoitre the ground on a front of 30 kilometres, and an equal depth of country.

He can see, note down and often photograph the enemy's emplacements, assemblages of troops, and masked batteries, discover the position of reserves, and troops marching to the field of battle, in fact all the most useful information for the conduct of the fight on a front of one or two Army Corps.

The aeroplane therefore we find is enabled by its moderate price and its handiness to play a great part in the organisation of an army.

The personnel and the matériel required for its upkeep are small compared with the great utility to which it may be put, and every Army Corps might easily have at least two machines attached to it, so as to always have one ready for use, or if both are available one could be told off to a detachment charged with a special mission and the other remain ready with Army Corps Head-quarters.

In modern warfare, which is all based on secrecy and invisibility, all composed of marching under cover, blindages, and screens, what advantages will that side have who knows where the main body of the enemy is, behind what crest his batteries are placed, what roads and screened approaches he should cover with his fire!

There will then be no more hesitation, no counter-marching, no more waste of ammunition as occcurred so often in the Russo-Japanese War.

By means of the aeroplane the war cloud will be dispersed, the blank of the modern field of battle will be filled with men.

The following might be the composition of an aeroplane equipment of an Army Corps:—

One pilot who would be either an officer or a non-commissioned officer, one assistant pilot, 4 mechaniciane, 2 chauffeurs, one carriage and 3 horses for transporting the starting gear, one carriage and 3 horses for carrying the personnel and spare parts.

The latter could be replaced by a motor car which might also work a windlass for starting.

Employment in Sieges:—

In siege warfare, very great and invaluable use should be made of dirigible balloons, but if these are not available or have been put out of action, or it is not desired to expose them to the enemy's fire, their place may be taken by an aeroplane.

If care has been taken to point out well marked landmarks, an aeroplane can easily obtain all the required information.

As in the case of aeroplanes employed in field warfare, they must be two seated. The reconnaissance officers should be very expert at the work and should have a thorough knowledge of the country.

At night time the aeroplane can, by means of signals, point out working parties by the aid of searchlights or of star shell, thrown on to the suspected zones of work.

Photography may be often made use of from an aeroplane.

In consequence of the present state of motor construction, aeroplanes cannot always be successfully employed in mountain warfare, partly owing to wind currents and partly owing to the difficulty of ascending into nigh altitudes.

In warfare on the sea coast, objects on

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the water can easily be observed, and as submarines cannot act either at night or in bad weather, they can always be discovered by an aeroplane.

In acting against dirigible balloons, aeroplanes can easily carry quite small melinite shells with lighted fuzes attached, to drop on the enemy's dirigibles.. The fuze or slow match must of course be sufficiently long to allow the aeroplane to get clear of the explosion.

In order to attack aeroplanes successfully, certain men must be instructed in firing at very high angles of elevation, and even then an aviator who is able to keep his machine at a height of 600 metres, and to fly at the rate of 60 kilometres an hour has little to fear.

At trials of high flying, aeroplanes have often reached a height of 2,500 metres so that there ought to be no difficulty in keeping out of range of musketry fire.

In France and in Germany trials have been made of firing at aeroplanes with machine guns fixed on motors in such a way that they can be fired from the shoulder.

Then again aeroplane can be attacked by aeroplane, and machines not being used for reconnaissance can be usefully employed in the attack of the enemy's aeroplanes.

Manœuvres arranged by Lieutenant Colonel Estienne of the French Artillery between Reims and Mourmelon, have shown how this was possible.

These manœuvres took place on the 13th July, 1910.

In conclusion, let us not neglect the advantages we have already gained against any of our possible adversaries.

Let us maintain a number of machines and train our officers and men in the art of aviation, and let the staff be fully conversant with all that appertains to the navigation of the air so as to take every advantage thereof,

General von Blume, was quite wrong when he said that this new art is entirely in favour of the defensive.

General Langlois, has conclusively shown that every advance in the art of war is directly advantageous to the offensive. And this holds good with this new arm of the service.

A. H. C. Phillpotts, Col. late R.A.

French Schools of Aviation.

From Russki Invalid, No. 195 of 1910.

I have just returned from Mourmelon in France, where I have been taking lessons in the Farman and Bleriot Schools of Aviation and I should like your readers to share my impressions of the deplorable state of the instructional branch of aviation in the French schools at the present time.

All that I say of Mourmelon will, I think, apply equally well to the other schools of aviation in France.

Our idea of a school in Russia, is ordinarily associated with a solid systematically arranged method of instruction. We therefore picture to ourselves a crowd of pupils thirsting for knowledge, eagerly pressing round a worthy and estimable master such as Farman or Bleriot.

All your doubts and difficulties you will lay before him, the beloved professor, and he will expound the matter and make everything clear to you. Are not these men persevering "Sons of Science," who have devoted so much of their mental power to the perfection of aviation? Surely they will not be swayed by mere material considerations. So you think here far away in Russia.

But now for the actual state of affairs.

1. Farman's school:—

When you order a machine for yourself any of the firms will, as a rule, undertake to teach you how to fly[1]

After you have given the order, and deposited a sum of money agreed upon, you commence in the school. Now you are going to be really busy. Farman's machine (biplanes), are as everyone knows, double-seated; the firm's pilot will, you imagine, take you up as a passenger 15 or 20 times, and then after 10 lessons or so will allow you to assist in controlling the elevating lever and will decide whether you have mastered the methods of control; i.e., whether you are ready for an unaccompanied flight. Then you will have risen to the rank of those pupils who make independent flights, and how many of these flights you will require for thorough mastery, depends on your own capacity.

All this may sound very well, but please consider that during the period of my tuition (spring 1910), there were over 15 pupils at Farman's, and only one trained instructor, and one pilot, who was usually engaged in experimental work and trial flights of other machines. The weather at that time too (Feb

[1] There are also few pupils who without ordering a machine, pay 4,500 francs for instruction, and the school is responsible for any breakages or damage.

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March, and April), was terrible; there were occasions when, after bad weather, one could not go out into the field for 12 days or more, and once the wind blew for two or three weeks on end. Further, the manœuvring ground at Chalons, where the flights took place, was from 6 a.m.., occupied by troops and one could only fly before that hour, and then on a signal being given all machines had to be taken into the hangar and no further flights could take place until after 4 p.m. Then no sooner did a favourable moment for flying occur than all the pupils would at once fasten on to the pilot's machine; everyone wishing to take lessons at once. There was no order, no routine observed. but absolute confusion reigned: the boldest and most importunate attained success sooner than the rest. You would be filled with joy perhaps, when you had at last succeeded in flying a little way, but you would look round, find something had happened to the machine (the motor was old and unreliable and breakages were frequent), and it would be conducted back to the hangar.

Bleriot's school:—

In March of this year, a certain M. Borel, opened a Bleriot school at Mourmelon. Such schools are often opened by agents, who sell the aeroplanes of one or of various designs.

What does the opening of a school of aviation signify?

Usually one or two aeroplanes are obtained from a factory under certain conditions, and a hangar is erected to contain the machines in some field suitable for aviation. Opportunity is given to anyone to learn how to fly on an instructional machine for 2,000 francs, but if any breakages occur, he has to pay for them out of his own pocket! If the firm undertakes to make good the breakages, the fee is increased from 2,000 to 2,500 francs.

If a machine is bought through the firm they will house it free for a certain time; otherwise, the charge for housing is about 10 francs a day.

If you have an accident, the repairs take a long time as the workmen who do them are generally indifferent, and the charges are exhorbitant. In fact aviation is an expensive sport, particularly just now while the science is in the stage of development, while competition is limited and everywhere arbitrary charges obtain. He who goes to France must be amply supplied with patience and money; no amount of care or economy will save you from being out of pocket or from wasting many months.

We hope that when schools of aviation are formed in Russia, they will not take the French schools as their model.

A. E. Harrison, Major, late R.F.A.

Memorial de Artillería.

The June number for last year has on the inside of the cover, a selection from the maxims by the Chinese writer on Military Art, SUN, who lived some 500 years B.C., and whose work has recently been translated by Captain Calthrop, R.F.A. and reviewed in a recent number of the "Memorial."

These maxims are as true and instructional now, as they were when written. Those quoted in the "Memorial" for June bear on "The spirit of the troops" and on "Causes of strength or weakness."

A paper by Captain Patricio Prieto of the Artillery deals with the Meteorological Station, established in the Artillery Training camp at Carabanchel, under the direction of the first section of the Central School of Gunnery. This station is used by the latter as well as by the Committee of Artillery Experiments to determine the value of the various elements, such as atmospheric pressure, temperature and hygrometric condition of the air, tension of the vapour of water contained in the air, evaporation, velocity and direction of the wind, and amount of rainfall, with regard to artillery and musketry fire, as well as to its effect on gunpowders and time fuzes.

The Meteorological Station of Curabanchel is situated near Madrid at an altitude of 675 metres above the sea, and is now used for national as well as for military purposes and supplies the results of its investigations to the Central Meteorological Institute at Madrid which collects and co-ordinates all the data appertaining to the subject which it receives from other similar establishments in the country, and publishes in its annual report.

The barometers, thermometers, hygrometers and anemometers used are described in this article at some length, and examples are given of how the corrections for atmospheric conditions are obtained and worked out for a given gun, e.g. the 7·5 c.m. Q.F. field gun of 1906.

Appended are numerous tables worked out for various conditions of atmosphere intended for the guidance of students of the subject.

An interesting resumé is given of the annual visit paid by the senior cadets of the Artillery Academy at Segovia to the

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various factories and military establishments, for the purpose of seeing the practical application of the work they have been studying from textbooks. The cadets who attend this annual course are those of the fourth and fifth years, (the two last) at the Academy. The time allowed for the journeys and work is short, but very fully allotted, and the programme and description of the work seen—lectures, experiments, practice, etc. is interesting as bearing evidence of the very complete course of study which the Artillery Cadets have to pass before being commissioned in the Corps.

The July issue gives the rules on which the publication and compilation of the "Memorial de Artilleria" are based.

The "Memorial" is conducted by two distinct Entities:—

1. An Examining Committee for the purpose of reading and judging af the quality of the contributions submitted for publication. It consists of the Colonels who are on the Staff of the Facultative Artillery Committee, one Colonel of Artillery holding a comand in Madrid, the colonels of the Madrid Section of the School of Gunnery and Committee of Experiments, and of the Colonels, Directors of the Museum, and "Taller de precèsion." The senior presides.

2. A Director, who is a Colonel in the Corps, assisted by a staff of three Editors, Captains or Majors.

The Examining Committee have all papers sent them by the Director, and returns them docketed "Publishable" or "Not Publishable" after a careful consideration of them from all points of view. If they consider the paper of "special merit," a note to this effect is appended.

Authors correct their own papers, but the Director is empowered to edit a paper so far as minor modifications are concerned, for the improvement of form or style; he is not authorized to alter the fundamental sense of the writings.

Rejected MSS. are returned. Extra copies of published articles can be had on payment. The same author is not supposed to figure in two consecutive numbers except for some very special reason.

The Director of the Memorial is held responsible to the General Officer at the head of the Artillery Section in the War Office, to whom he refers important questions. Certain official papers of interest are sent to the Director of the "Memorial" by *ordre supérieure* for publication. There is no mention of money rewards for articles sent to the "Memorial" but from its official nature there can be no doubt that authors contributing valuable paners obtain their reward by favourable notice.

The article on Experiments with cartridges, loaded with "acute pointed" bullets which has been continuing to appear in the "Memorial" for several months, at intervals, and which has already been noticed in this Journal, has now concluded in the July number.

The Committee which has been conducting the experiments on a most exhaustive scale have sent in their report which is generally in favour of the adoption of a sharp pointed bullet, loaded with progressive powder which combines good conditions of stability and preservation in the climate of Spain. They consider the present Mauser rifle of 7 millimètres to be superior to the regulation weapon in other armies.

A large number of advantages are claimed for the new cartridge, the chief of which are accuracy, flatter trajectories, larger zone covered by fire at all ranges and longer range, greater penetration into wood. When fired at the shields of the field guns, at 400 yards, the new bullet perforated at that distance, whereas with the present service cartridge, they do not perforate at 100 yards.

It was found that the recoil was greater than with the present cartridge; but less than with the old Remington rifle.

The wounds on some organs of the human body produced at short range were disastrous [*sic*].

The summary, consisting of 38 items, deals completely with all details of weight, measurements, composition, effect on the bore of the rifle, the angles of dispersion, charge and class of powder, heat and other tests, etc., the questions which are still not finally settled are:—

(a). That of the life of the bore. The bores of the rifle used for the experiments have successfully resisted 4,000 rounds, but experiments still have to be made with hardened bores. If 4,000 rounds is to be considered the limit of the life of the rifle barrel, then it will be necessary to supply new rifles to a force entering on a campaign, and should a campaign be prolonged the Artillery Park must find means for examining the rifles and for replacing worn-out barrels.

(b). The question of obtaining uniformity and regular action as regards the life of the barrels in machine guns. There are good hopes of solving this satisfactorily in conjunction with the firm of Hotchkiss.

(c). The last and most interesting question to solve is that of the preservation of the gunpowder and its chemical stability. The powder which gives greatest hopes is that of the German firm of Rotweil. The class of powder selected is that known as 1319.6, deprived of camphor, and seems to satisfy the exigencies of the Spanish climate. This point is to be further submitted to the Royal Laboratory and Powder Factory at Granada for study and experiment.

In the belief that the three questions above quoted will be satisfactorily settled, and to avoid further delay in solving this important problem the Committee consider the time has arrived for taking the risk of ordering 300,000 cartridges, which will admit of further experiments on a large scale. Various useful tables complete the report.

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The July number of the "Memorial" also contains a translation from an article in "La France Militaire" of June, 1910, commenting on the paper in a recent number of the "Memorial" headed "An Act of Justice" and which we noticed in the "Journal of the Royal Artillery Institution" for July, under the heading of "The Scientific Corps in Spain." The article is headed "High Commands in the Spanish Army" and states that in all the military powers, the Artillery arm is represented in the higher army commands by a contingent of General Officers as numerous as they are brilliant. It then shows that this is not the case in the Spanish Army, and quotes the figures which we have already seen mentioned in the article "The Scientific Corps in Spain" above mentioned.

"La France Militaire" comments in strong terms on this strange anomaly, the article ends thus "We believe we are "only giving proof of our affectionate "sentiments towards the Spanish Army, "when we say that we should like to see "the Spanish General Staff formed in "accordance with modern ideas; by this "means the individual heroism of the "soldier will meet with the solid guaran-"tee of a complete command, without "which there can be no useful result."

The new text-book of tactical instruction for the Spanish Horse and Field Artillery has just appeared. It has been drawn up by the Committee on Tactics of which H.R.H. the Infante D. Carlos de Bourbon is President.

The August number of this Journal is largely devoted to an account of the visit of His Majesty King Alfonso XIII. to Segovia on the 15 July, 1910, for the purpose of inspecting the Artillery Academy, conferring Commissions of 2nd Lieut. on the Senior Class of Cadets who have completed their fifth year of study, and for the inauguration of the fine Monument erected by the Nation at Segovia to immortalize the memory of the heroic Artillery Officers Daoiz and Velarde who lost their lives on 2 May, 1808, in the defence of the Artillery Park at Montelèon against the French invaders.*

The account of the inauguration is very full and contains all the speeches: it is also accompanied by excellent photographs of the monument and its artistic and spirited bas-reliefs from various points of view.—The sculptor is D. Aniceto Marinas.

The event was an important and auspicious one for the Corps of Artillery, which will long be remembered.

The same issue reproduces in full, a translation of the article "The Scientific Corps in Spain" which appeared in the July issue of "The Journal of the Royal Artillery," and expresses the thanks of the "Memorial" for the sympathy therein expressed.

J. C. Dalton, Major General, R.A. (retd.).

* A full account of this event was given in "The Journal of the Royal Artillery," Vol. XXXV., No. 10, p. 445.

Dirigibles controlled from the earth.

Translated from "Russki Invalid," No. 107.

By degrees the idea of a pilotless dirigible begins to assume an appearance of probability. In America, as our readers are aware, there have already been the experiments of Antony, who has succeeded in manœuvring his dirigible by means of wireless telegraphy.

Now similar experiments have been made in England by a certain Mr. T. R. Phillips who has, in London, designed and built a model dirigible 12 feet in length. This model without being actually connected to anything is completely under the control of the inventor, who has succeeded in carrying out a whole series of manœuvres with it, by actuating the propellor by wireless telegraphy. This adaptation of wireless telegraphy promises a future greater than the mere transmission of messages.

Phillip's dirigible, besides changing direction in obedience to the wave influence from a central station, can, also at the will of the operator, drop paper models of birds at any desired spot. The inventor claims that it can just as easily throw bombs. Attention is compelled to these experiments, in view of the fact that they are being carried out simultaneously in different countries, and that the sphere of operations by wireless telegraphy is tending constantly to increase.

Perhaps the time is not far distant when one will be able to send out a dirigible to reconnoitre, furnished with photographic apparatus, and controlled by wireless; such dirigible could easily go to an appointed place, take a series of photographs, or hurl bombs and return.

One may a priori surmise that before long experiments will be made in controlling aeroplanes from the ground, but inventors are here met with a tremendous difficulty, to overcome which will be no light matter. that is, the instability of these machines in the air and consequently a greater difficulty in their control, but there can be no doubt that the human mind will triumph over this difficulty, as it has in time past conquered frequently, problems which at the first glance appeared insurmountable.

A. E. Harrison, Major, late R.A.

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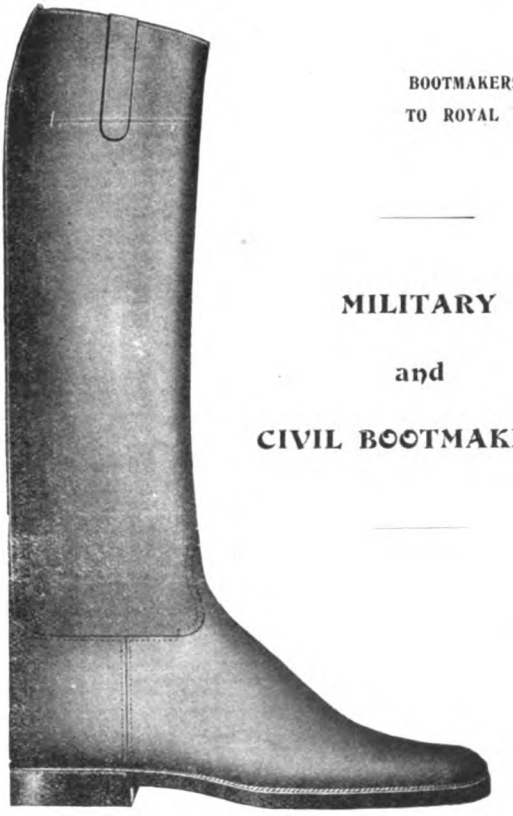

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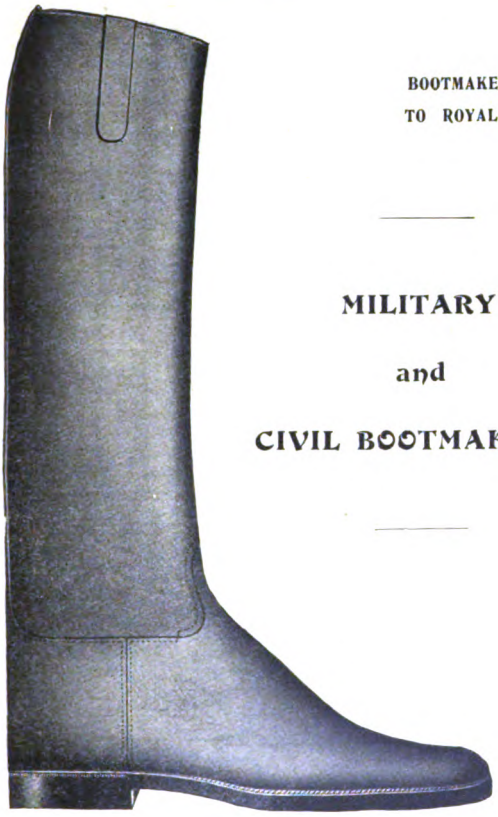

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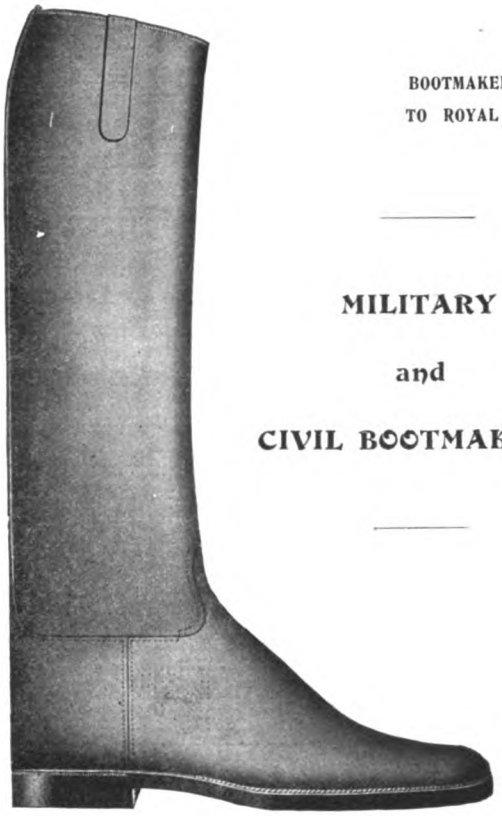

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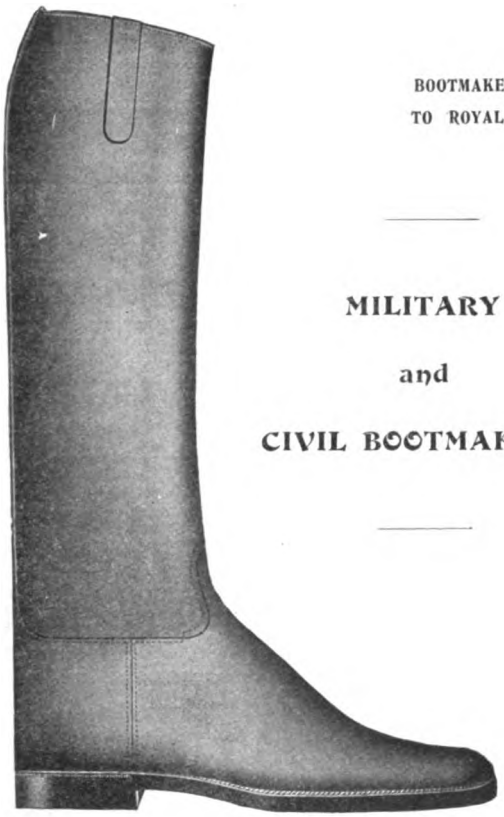

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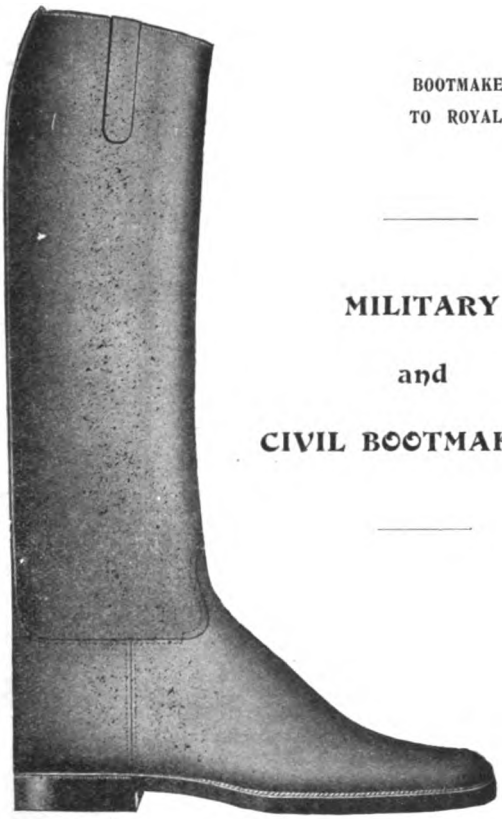

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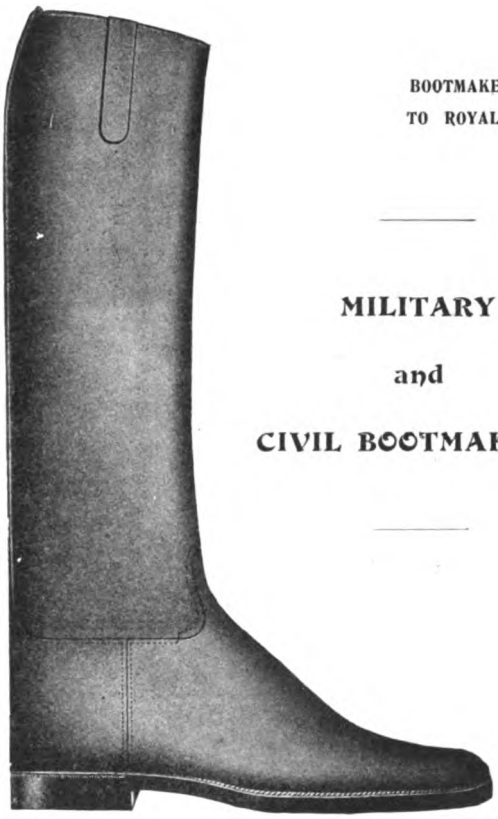

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Lieut. E. Clayton, Royal Field Artillery.
Capt. R. R. Hill, Royal Garrison Artillery.
" H. F. L. Grant, Royal Garrison Artillery.
" R. G. Troup, Royal Marine Artillery.
" L. C. Jackson, C.M.G., Royal Engineers.
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" C. E. Lea, Worcestershire Regiment.
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" W. A. I. Kay, King's Royal Rifle Corps.
Capt. E. A. Bradford, King's Royal Rifle Corps.
" E. L. Makin, Wiltshire Regiment.
" G. E. Leman, North Staffordshire Regiment.
" C. M. Gibbon, Royal Irish Fusiliers.
Lieut. Hon. M. A. Wingfield, Rifle Brigade.
Capt. S. F. Muspratt, 12th Cavalry (Indian Army).
" V. E. Gwyer, 10th Jats (Indian Army).
" W. S. Leslie, 31st Punjabis (Indian Army).

Nominations:—

Capt. A. Hind, Royal Field Artillery.
" F. M. C. Trench, Royal Field Artillery.
" R. H. Kearsley, 5th Dragoon Guards.
" C. F. Watson, D.S.O., Royal West Surrey Regiment.
" W. Northey, D.S.O., Durham Light Infantry.
Capt. and Brevet Major Hon. R. A. Campbell, Cameron Highlanders.
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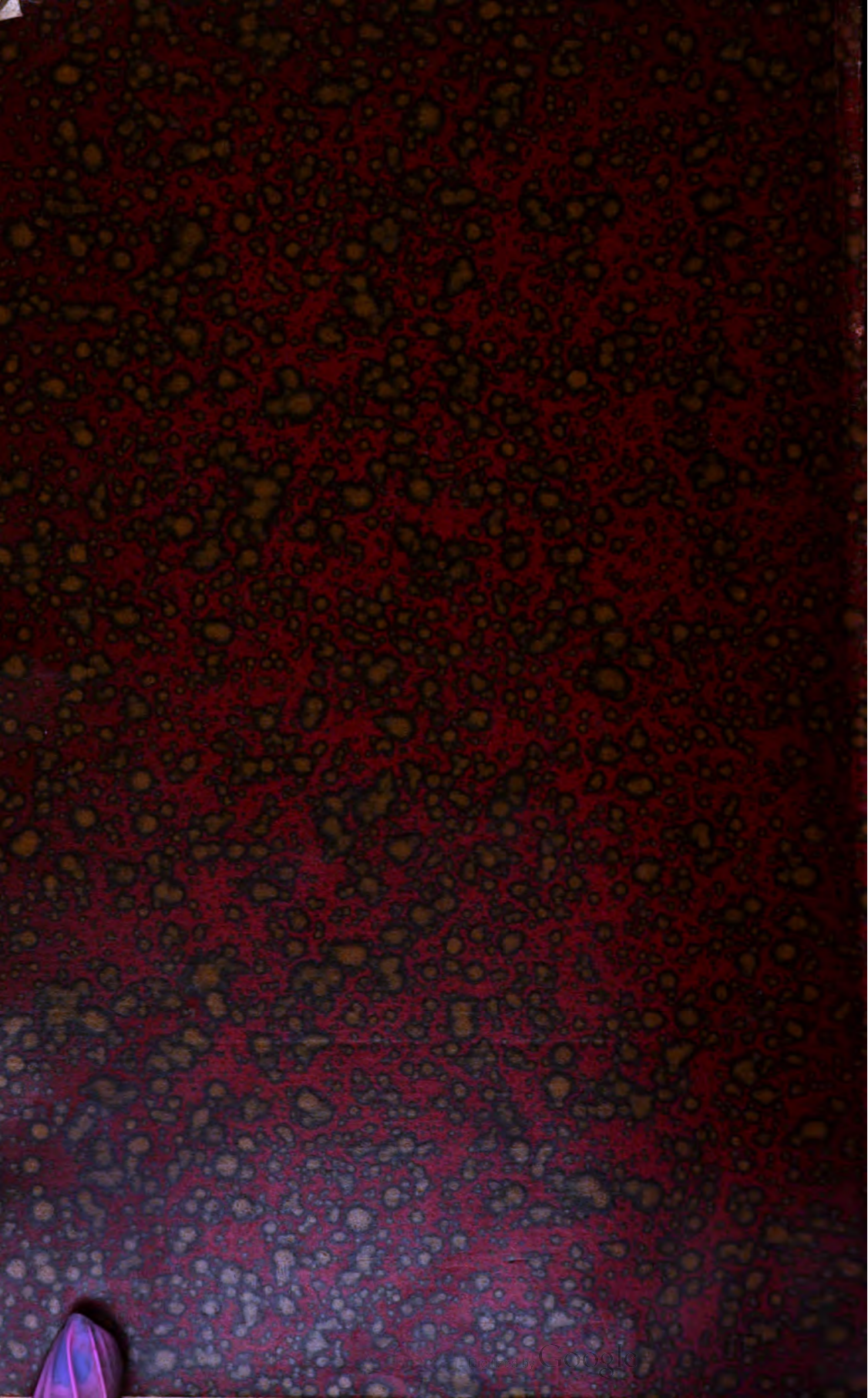

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